

THE GASTROPODS OF THE OLDER TERTIARY OF AUSTRALIA. (PART I.)

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[Read October 4, 1887.]

PLATES I.-XIII.

[NOTE.—All measurements are in French millimetres. The direction of the ornament or sculpture is termed *spiral*, or *encircling* when it follows the spiral curvature of the shell; when coinciding with the lines of growth *transverse* as regards the whorls, or *axial* with respect to the length of the shell.]

FAMILY MURICIDÆ.

GENUS TYPHIS.

SYNOPSIS OF SPECIES.

Varices spinous.

Upper whorls angular; varix simple.

1. *T. McCoyii*.

Upper whorls squarely rounded; varix double.

2. *T. acanthopterus*.

Varices foliar, adpressed, laciniated.

Shell four times as long as wide; whorls almost disjoined, posteriorly sloping inwards.

3. *T. disjunctus*.

Shell stouter; whorls quadrate, posteriorly flat.

4. *T. laciniatus*.

Varices angular; whorls subangulated.

5. *T. tripterus*.

Varices absent; tubular projections compressed, adpressed to the spire.

6. *T. evaricosus*.

1. *Typhis McCoyii*, *T. Woods*.

Typhis McCoyii, *T. Woods*, Proc. Roy. Soc., Tasmania, for 1875, p. 22, t. i., fig. 5.

Typhis hebetatus, Hutton, Trans., N.Z. Inst., vol. ix., t. xvi., fig. 1, 1877.

Shell ovately fusiform; whorls seven and a-half, the two and a-half embryonic whorls small, smooth, and rounded; the next one or two squarely rounded and medially keeled; the rest subangularly convex, the keel close to the anterior suture. Body whorl somewhat quadrately convex, with four spinous varices which end posteriorly on the blunt posterior keel in a strong spine, anteriorly they are flatly expanded. There are five or six spines on each varix, which diminish in size towards

the canal; the spines on the varices of the second posterior whorl are sometimes connected by a faint spiral ridge. Between each varix is a tubular spine. The posterior whorls, with alternating conical spines and tubular projections. Surface marked with striæ of growth, otherwise smooth. Aperture ovate; peristome continuous, thick, erect; canal closed, compressed, of moderate length, curved to the right; anterior varix decurrent on the outer face of the canal. The three other varices terminate in imbricating spines spirally arranged on the canal.

Length, 38; breadth, 22.

Localities.—Table Cape (*Hobart Mus.*, *R. M. Johnston*!); lower beds at Muddy Creek; River Murray Cliffs, near Morgan. Also in the Pareora Series at Mount Harris, &c., N. Zealand (*Wellington Mus.*!).

The identification of *T. hebetatus* with the Australian *T. McCoyii* rests upon the comparison of authentic specimens.

This fossil is somewhat related to *T. pungens* of the European Eocene; but it has a shorter spire, different shaped whorls, and more spines on the varices.

2. *Typhis acanthopterus*, *spec. nov.* Plate i., fig. 2.

Shell ovately fusiform; whorls seven and a half; the one and a half embryonic whorls, small, rounded, and smooth; the rest of the spire of gradated whorls, the posterior one-third of each whorl flattened or slightly sloping; the ornament consists of a row of relatively large spines on the shoulder of the whorl and of two rows of smaller spines between the former and the anterior suture. The body whorl is squarely rounded, ornamented with four spinous varices, each of which is subordinated anteriorly by a similar but smaller varix; there are about eight slender recurved spines on each varix; between each varix there is a stout, long, and tubular spine on the shoulder of the whorl. Aperture and canal as in *T. McCoyii*.

The surface is striated with growth-lines, and is obliquely ridged coincident with the variceal spines.

Length, 23; breadth within the spines, 10; length of aperture and canal, 14.

Locality.—In the blue clays at Schnapper Point, Port Philip Bay.

This species differs from *T. McCoyii* by its sub-quadrate whorls, more spines on the varices, by the duplication of the varices, and by the oblique ridges between the varices.

3. *Typhis disjunctus*, *spec. nov.* Plate i., fig. 14.

Shell narrowly elongated; whorls four and a half, sloping inward at the suture, almost disjoined; from the keel there

proceed four lamelliform varices with serrately dentate margins, and on the last whorl are continued on to the canal—there terminating in spiniform squamæ; alternating with the varices of each whorl are four tubular spines, long and backward directed. The surface of the shell is ornamented with faint spiral ridges and transverse folds and striations. Canal very long, flattened, pointed and slightly recurved at the end; aperture circular or nearly so; peristome continuous.

Length, 20; breadth, 5; length of aperture and canal, 12.

Localities.—Lower beds at Muddy Creek, Hamilton; and blue clays at Schnapper Point, Port Phillip Bay, Victoria.

4. *Typhis laciniatus*, *spec. nov.* Plate i., fig. 10.

Shell elongately fusiform; whorls five and a half, the one and a half embryonic whorls small and rounded; spire-whorls gradated, narrow, and flattened posteriorly, crowned at the shoulder with one row of spines. Body-whorl sub-angulated in front of the suture, attenuated anteriorly; ornamented with four lamelliform adpressed varices, their edges jagged but developed into a spiniform scale on the shoulder of the whorl; a long, slender tubular spine alternates with the varices. Surface striated with growth-lines.

Length, 11; breadth, 4·5; length of aperture and canal, 7.

Locality.—Lower beds at Muddy Creek, near Hamilton, Victoria.

This species differs from *T. disjunctus* by its smaller size, but greater proportionate breadth, and its more compact whorls.

5. *Typhis tripterus*, *spec. nov.* Plate iii., fig. 14.

Shell fusiform; whorls six, the two and a half apical ones smooth and rounded; the rest of the spire whorls medially subangulated, bearing a row of tubulations which are slightly posterior to the keel and alternate with a row of short conical projections situated nearer to the anterior suture. Body whorl subquadrately convex posteriorly, attenuated in front; ornamented with three angular varices, which terminate at the posterior angulation of the whorl in an ill-defined tubercle, and with three tubulations, each of which is closer to the varix in front of it than to the one behind.

Surface of the whorls finely striated with growth-lines, and at the bases of the tubulations obliquely striated. Canal long, broad, nearly straight, not closed.

Length, 9·5; breadth, 4·5; length of canal and aperture, 5·5. An incomplete specimen measures, length 13, breadth 6.

Locality.—Clayey green sands, Adelaide bore (two examples).

6. *Typhis evaricosus*, *spec. nov.* Plate i., fig. 6.*

Shell acuminate ovate; whorls six and a half, of which the two and a half apical ones are rounded and smooth; the rest of the spire whorls are convex, flattened at the suture, bearing tubulations at the shoulder which are broad, compressed, and prolonged backward; the posterior margin of each whorls is undulate. Body whorl with four tubulations, which are broad at the base, compressed, slightly bent to the left, and adpressed to the spire; the tubulations are continued on the anterior portion of the whorl as broad, curved, medially depressed undulations. There are no varices between the tubulations.

Aperture oval; peristome continuous; canal closed, compressed, broad, and abruptly tapering to a short hardly recurved point.

Surface smooth and shining, marked with striæ of growth and faint spiral lines, and faintly obliquely ridged on the tubulations.

Length, 7; breadth, 3; length of aperture and canal 3.

Locality.—Lower beds at Muddy Creek.

T. evaricosus agrees with the recent species *T. duplicatus*, Sow., and *T. arcuatus*, Hinds., in having the tubulations bent back, and the varices obliterated by confluence therewith; from the first, to which it is more allied, it differs by its smaller size and adpressed tubulations.

GENUS MUREX.

SYNOPSIS OF SUBGENERA.

Varices three, wing-like	<i>Pteronotus</i> .
Varices three, foliar	<i>Chicoreus</i> .
Varices more than three	
Canal long, nearly straight; spire very short.	<i>Rhinocantha</i> .
Canal short.	
Varices spinose.	<i>Phyllonotus</i> .
Varices foliated or simple	<i>Ocinebra</i> .

SUBGENUS PTERONOTUS.

SYNOPSIS OF SPECIES.

I. Varices three on each whorl, continuous from whorl to whorl.

* The figure, which was drawn from a worn specimen, though fairly representing the shape and position of the tubulations, does not show the tubulations applied to the spire in the manner exhibited by subsequently acquired examples.

a. Last varix broadly expanded.

A. No nodules between the varices.

Distantly finely lirate; finely striated transversely.

M. velificus.

Strongly lirate, with arched discontinuous threads between.

2. *M. rhysus.*

B. One intervariceal nodule.

Upper whorls inornate; shell ovate.

3. *M. calvus.*

Upper whorls lirate; shell narrower.

1. *M. velificus, var.*

b. Last varix narrowly winged; extended into a spine.

Spine long; no nodules between the varices.

4. *M. manubriatus.*

Spine inconspicuous; three intervariceal nodules.

5. *M. trinodosus.*

II. Varices three on body whorl, increasing posteriorly; discontinuous; outer lip denticulate.

Spiral threads, about 20, slender.

6. *M. bifrons.*

Spiral threads, about 8, stout.

7. *M. didymus.*

1. *Murex velificus, spec. nov.* Plate i., fig. 8.

Shell trigonal elongated, very thin. Whorls seven, of which the one and half apical whorls are small, smooth, and rounded. The rest of the shell is provided with three varices. Whorls flatly convex, ornamented with fine spiral ridges on the anterior half (four on the penultimate whorl) and transverse striae and threads. The varices are widely foliaceous, erect, axial, and regular; ornamented with radial ridges continued from the lirae of the whorls, and arched transverse striae and threads; the margin of the varices is entire or inconspicuously serrated.

Aperture small, oval; peristome continuous, thickened; the outer lip crenulated on the margin. Canal long, nearly closed, slightly oblique, tapering to a slender recurved point.

Some individuals from the River Murray cliffs possess an intervariceal tuberculation.

Total length, 28; breadth, 7; length of aperture and canal, 18.

Localities.—Lower flats at Muddy Creek; blue clays at Schnapper Point, Port Philip; River Murray cliffs.

2. *Murex rhysus, spec. nov.* Plate i., fig. 7.

Shell trigonal elongated, thin; whorls seven (apex wanting), somewhat convex; varices three, widely foliaceous, erect, slightly obliquely directed, somewhat falcately reflexed; margin entire. Surface ornamented with stoutish, narrow, angular,

equidistant threads (15 on the penultimate whorl), the much wider intervening furrows, with subremote, curved, disconnected raised lines, as in the recent *M. triformis*. Aperture oval; peristome continuous, its margin thin and plain; canal unknown.

Length, excluding canal, 32; breadth, 14; height of aperture, 11.

Locality.—Blue clays at Schnapper Point, Port Philip.

This species is distinguished from *M. velificus* by its rounded whorls, equally ornamented with spiral threads, by its peculiar interstitial sculpture, and by the shape of its last varix.

3. *Murex calvus*, *spec. nov.* Plate i., fig. 11.

Shell ovately fusiform; whorls seven; varices three, oblique, narrowly foliaceous, margin entire; one intervariceal small nodulation. Surface of anterior whorls with distant faint spiral threads, crossed by distant faint ridges and striæ; upper whorls transversely striated. Canal open, curved to the left, apparently short; aperture large, ovately-oblong, inner lip dentate.

Length (incomplete), 22; breadth, 9; height of aperture, 7.

Localities.—Clayey sands, Adelaide bore; and Turritella-clays, Blanche Point, Aldinga Bay.

This species resembles *M. rubridentatus*, Reeve, in shape and obliquity of varices, but it has only one intervariceal nodulation. In all the above characters it is related to *M. pinnatus*, Wood, but the variceal wings are not interrupted as in that species.

4. *Murex manubriatus*, *spec. nov.* Plate i., fig. 9.

Shell elongately fusiform; whorls seven, somewhat convex, subangulated medially, faintly and distantly spirally lirate, and closely striated, transversely faintly ridged; spire rather obtuse, of one and a half smooth rounded whorls. Varices slightly oblique, narrowly foliated, each ending in a posterior slightly recurved long spine; margin of varix entire.

Aperture ovate; peristome continuous, outer lip slightly thickened, edentulous. Canal closed, long, nearly straight, and slightly recurved.

Length, 24; breadth, 8; length of apertures and canal, 16.

Localities.—Clayey sands, Adelaide bore; and Turritella-clays at Blanche Point, Aldinga Bay.

5. *Murex trinodosus*, *spec. nov.* Plate i., fig. 4.

Shell trigonal elongated; whorls six or more, somewhat convex, with three stout intervariceal nodulations; last whorl inconspicuously biangulated. Varices oblique, very narrowly winged, each ending posteriorly in a short spine. Aperture

large, ovate, peristome continuous, outer lip edentulous; canal straight and short.

Length, 20; breadth, 8·5; length of aperture and canal, 7.

Locality.—Upper beds at Muddy Creek.

Murex trinodosus is separable from the recent *M. Angasi*, Crosse, by being broader across the posterior part of the body whorl, by the variceal spine not hooked, by the less angulated whorls, longer canal, and by having three stout intervariceal nodulations instead of two inconspicuous ones.

6. *Murex bifrons*, *spec. nov.* Plate i., fig. 12.

Shell ovately trigonal, stoutish; whorls six, convex, spirally equally ridged; apex obtuse, of one and a half smooth whorls. Varices foliaceous, moderately broad, erect, oblique, and irregular; there are three on the body whorl, but six on each of the posterior whorls. Body whorl with about 20 equidistant slender, spiral threads, transversely striated; margin of the anterior varix slightly crenulated between the liræ. Aperture large, subquadrate; peristome entire; outer lip tuberculated on the thickened margin; canal short, open, curved.

Length, 15·5; breadth, 6; length of aperture and canal, 9.

Localities.—Adelaide bore and "Turritella clays" at Blanche Point, Aldinga Bay.

7. *Murex didymus*, *spec. nov.* Plate iv., fig. 13.

This species is similar to the last, but has few (eight) and stouter spiral ridges on the body whorl, whorls flatly convex, the canal is proportionately longer, and the margin of the anterior varix is entire.

Length, 17·5; breadth, 6·5; length of aperture and canal, 11·5.

Locality.—Blue clays at Schnapper Point, Port Phillip.

SUBGENUS CHICOREUS.

SYNOPSIS OF SPECIES.

- I. Shell ovate; varices on anterior whorls crenately spinulose. 8. *M. lophessus*.
- II. Shell fusiform; varices spiniferous, regular.
 - A. Posterior spine short and broad.
 - Whorls rounded, penultimate whorl, equally liræ. 9. *M. Dennanti*.
 - Whorls subquadrate, penultimate whorl with three strong liræ. 10. *M. Adelaidensis*.
 - B. Posterior spine long.
 - a Two intervariceal costæ. 11. *M. basicinctus*.

b No intervariceal nodulations

Posterior spine very long and attenuated.
12. *M. tenuicornis*.

Posterior spine stout, somewhat upward
dilated and truncated.

13. *M. amblyceras*.

III. Shell fusiform; varices simple, irregular.

Varices three on last whorl, increasing in number posteriorly; apex small acute. 15. *M. irregularis*.

Varices three to each whorl; apex large obtuse; lamellæ closer. 14. *M. Hamiltonensis*.

8. *Murex lophœssus*, *spec. nov.* Plate ii., fig. 5.

Shell ovate, conical; whorls eight, including two small smooth rounded turbinated apical ones; the rest of the whorls ventricose, rounded, ornamented with compressed spiral ribs, and transverse lamellæ of growth. Varices, three to each whorl, those on the anterior whorls more or less regular, narrow, thin, and pectinated; the varices of the posterior whorls are simply crenulated by the liræ which pass over them.

The spiral ribs, which are from six to eight in number on the penultimate whorl, are very narrow, the broad concave intervening furrows usually having a medial slender thread; they are traversed by rather crowded lamellæ of growth, which form inconspicuous scales on the liræ. There are usually three or four intervariceal costæ, which are never very prominent—not at all developed on the posterior five or six whorls.

Last whorl with from 12-14 principal liræ which are continued on to the varices, there projecting as small serratures. Aperture oval; peristome continuous; inner lip faintly lirate within; outer lip stoutly lirate within, its margin serrated. Canal closed, depressed, short, sinistrally bent and slightly recurved.

Length, 40; breadth within the varices, 23; height of aperture, 13.5; length of canal, 12.

Localities.—Blue clays at Schnapper Point, Port Philip; lower beds at Muddy Creek.

9. *Murex Dennanti*, *spec. nov.* Plate ii., fig. 7.

Shell elongate-fusiform; whorls eight, including two small, rounded, smooth apical ones; the rest of the spire whorls convex, slightly depressed at the posterior suture. Varices three, more or less regular compressed, each bearing at the angulation of the whorl a short, broad, erect spine. The fourth, fifth, and sixth whorls with tessellated ornament, more or less granulated

at the intersections, produced by the intercrossing of transverse and from four to six spiral threads—there is one spiral thread on the posterior slope. On the anterior whorls the spiral liræ increase in number, and are of unequal dimensions, whilst the transverse threads become indistinct, or are reduced to striae. On the penultimate whorl there are ten unequal liræ in front of the angulation, which pass over the varices, producing crenations on their margins; whilst on the posterior slope there are five very slender threads. Aperture ovate, peristome continuous; outer lip thin, smooth within; canal longer than the aperture, contorted and slightly reverted.

Length, 30; breadth, 11; length of aperture and canal, 17.

Locality.—Lower beds at Muddy Creek.

10. *Murex Adelaidensis*, *spec. nov.* Plate ii., fig. 4.

Shell elongate-fusiform; whorls nine, including two small, rounded, smooth, turbinated apical ones; the rest of the spire whorls subquadrate.

Varices on the three anterior whorls more or less regular, three to each whorl, compressed foliar, each bearing at the posterior shoulder of the whorl a short, broad, erect spine. On the posterior whorls the varices are eight to each whorl, foliar and fimbriated, graduating posteriorly into vaulted scales.

Whorls of the spire, excluding the apical ones, ornamented on the medial portion with three strong spiral liræ, or two strong ones with one or two smaller intervening ones; the posterior slope with one, two, or three slender spiral threads; and there are usually two next to the anterior suture. The whole surface finely striated in a spiral direction, and crossed by rather distant imbricating lamellæ of growth.

Last whorl quadrately-convex, with three or four spiral threads on the depressed area next the suture, the anterior portion with about 15 strong equidistant spiral liræ alternating with slender ones, crossed by subdistant transverse threads less prominent than the principal liræ.

Aperture ovately-oblong; inner lip crenulated on the margin and lirate within; canal not exceeding in length that of the aperture, open, and sinistrally curved.

Length, 20; breadth, 9; length of canal and aperture, 11.

Localities.—Adelaide bore; and "Turritella clays," Aldinga.

11. *Murex basicinctus*, *spec. nov.* Plate ii., fig. 9.

Shell elongate, fusiform, with a high gradated spire, terminating in a small blunt mamillate apex. Whorls eight, including two smooth apical ones; the next two are rounded, but

flattened at the suture, with four, increasing to six, spiral threads, and about 12 costæ to each whorl; the rest of the spire-whorls medially angulate, ornamented with minutely-scaly spiral liræ, each whorl with three varices and two uninterrupted, prominent, intervariceal costæ. The varices are simple, regular, slightly oblique, each bearing medially a stout, somewhat frondosely expanded spine.

Last whorl with about 15 narrow liræ on the posterior slope; there is a strong revolving rib in alignment with the posterior angle of the aperture bearing a short spine on each varix. Between the basal rib and the shoulder there are about 20 liræ, and about an equal number anterior to it. The liræ are crossed by moderately distant striæ, which produce minute scale-like serratures at the junctions.

Aperture oval; outer lip thin, crenulated on the margin. Canal longer than the aperture, nearly straight and closed.

Length, 37; breadth, 15; length of aperture, 9; and of canal, 13.

Locality.—"Gastropod-bed" of the River Murray Cliffs, near Morgan.

This fossil has some resemblance to the recent *M. crocatus*, Reeve.

12. *Murex tenuicornis*, *spec. nov.* Plate ii., fig. 6.

Shell elongately fusiform, with a produced spire, terminating in a small obtuse apex consisting of one and a half smooth rounded whorls; the rest of the spire whorls are at first convex, but afterwards becoming increasingly angulated in the middle, each with three thin varices bearing a long slender spine. The ornament consists of one or two faint spiral threads on the anterior half of the whorl, and very fine spiral striæ and arched growth-lines, the intercrossing of which forms a fine close cancellation.

Last whorl angulated, ornamented on the anterior portion with five spiral ribs which terminate on the last varix as short spinous digitations; the variceal spine is long, slender, and slightly arched posteriorly.

Aperture trapezoidal, much longer than wide; peristome continuous, thin, elevated; outer lip angulated at the keel, with three tubercles within anteriorly situated to the angulation; canal long, flat, closed, nearly straight.

Length, 19; breadth, 7; length of canal and aperture, 12; length of last variceal spine, 9.

Locality.—Clayey green sands, Adelaide bore.

The species makes some approach to the recent *M. longicornis*, Dunker.

13. *Murex amblyceras*, *spec. nov.* Plate ii., fig. 12.

Shell elongate fusiform, with a high gradated spire, terminating in a small blunt mamillate apex consisting of two smooth globose whorls of which the tip is slightly turned down on one side and immersed. Whorls seven, excepting the apical ones, angulated, spirally lirate and transversely closely striated. Varices simple, obliquely continuous from whorl to whorl, each bearing a hollow, vaulted, reverted, blunt spine at the keel. Last whorl a little tumid, with a rounded base, much contracted and produced; ornamented with about eight unequal liræ on the upper part and about 20 similar ones in front of the keel, the stouter ones ending in small digitations on the last varix.

Aperture oval, with an elevated, thin, and continuous peristome; margin of outer lip wrinkled; canal long, curved, nearly closed.

Length, 25; breadth, 10; length of aperture and canal, 16.

Localities.—Lower beds at Muddy Creek; blue clays at Schnapper Point, Victoria.

Has considerable resemblance to *M. basicinctus*, but has no intervariceal costations or basal rib.

14. *Murex Hamiltonensis*, *spec. nov.* Plate iii, fig. 6.

Shell fusiform, somewhat thin, with a high spine of gradate whorls terminating in a blunt, rather large apex (1.5 mills. in diameter), consisting of two globose, faintly spirally striated whorls, the extremity of which is immersed. Whorls six, those of the spire, excepting the nuclear ones, ventricose, subquadrate, excavated at the suture, ornamented with four principal rounded, slightly elevated, spiral threads (one of which occupies the flat posterior area) and by rather distant fimbriated laminae of growth and transverse striae.

Last whorl somewhat tumid, narrowly flattened in front of the suture, and rather abruptly attenuated into the beak; ornamented with spiral liræ and three varices. The spiral liræ, of which two are on the posterior area and about ten on the rest of the whorl, are equidistant, sometimes with a slender interstitial thread, and raised into small arched scales as the transverse laminae pass over them.

Varices of thin adpressed foliations, three to each whorl, very irregularly disposed and not continuous from whorl to whorl.

Aperture oval-quadrate; peristome continuous, thin, and slightly reflected on the columella; outer lip lirate within. Canal shorter than the aperture, moderately arched to the left, and reverted.

Length, 20; breadth, 9; length of aperture and canal, 11.

Locality.—Lower beds at Muddy Creek.

This *Murex* very closely resembles young examples of *Rapana aculeata*.

15. *Murex irregularis*, *spec. nov.* Plate vi., fig. 3.

Similar to *M. Hamiltonensis*, with eight whorls, apex considerably smaller, the whorls abruptly truncated medially, the transverse laminae closer together and inconspicuously raised into scales, the varices irregular, three on the last whorl, increasing to four or six on the next whorls. The fifth and sixth whorls bicarinate and multicostate.

Length, 27; breadth, 11; length of aperture, 7; length of canal, 7; breadth of aperture, 5.

Locality.—Lower beds at Muddy Creek.

SUBGENUS RHINOCANTHA.

SYNOPSIS OF SPECIES.

Spire whorls subquadrate, conspicuously lirate; varices compressed, elevated. 16. *M. asteriscus*.

Spire whorls angular, faintly lirate; varices thick and depressed. 17. *M. pachystirus*.

16. *Murex asteriscus*, *spec. nov.* Plate ii., fig. 10.

Shell pyriform, with a low, somewhat trochiform spire, terminating in a small blunt mamillate apex of one and a half globose whorls. Whorls six and a half, the anterior ones subquadrate with a deeply impressed suture, graduating to flat-sided in the most posterior one. Penultimate whorl bicarinated, with a third angulated thread on the anterior slope, faintly ridged in a spiral and transverse direction.

Last whorl tumid, flattened posteriorly and abruptly attenuated anteriorly; ornamented with five spiral ribs in front of the shoulder, the interstitial spaces with spiral threads and transverse striae.

Varices, six on each whorl, obliquely continuous from whorl to whorl, simple, narrow, elevated, crenately-nodulose coincident with the liræ. Aperture large, ovately-oblong; outer lip lirate within; columella curved, thickened at its junction with the canal which is shorter than the aperture, nearly straight.

Length, 27; breadth, 19; length of aperture, 11; of canal, 9; breadth of aperture, 7.

Locality.—Lower beds at Muddy Creek.

17. *Murex pachystirus*, *spec. nov.* Plate ii., fig. 11.

Shell resembling *M. asteriscus* with a higher and flatter spire. Whorls six and a half, angulated next to the anterior suture; striated spirally, and each provided with six broad, depressed variciform plications, those of one whorl more or less alternating with those of the next, undulose between the varices. Last whorl ornamented with six equidistant spiral ribs, which

pass over the varices, and with about three slender threads in the shallow concave interspaces.

Aperture large, trapezoidal; outer lip faintly lirate within; canal nearly as long as the aperture, slightly curved.

Length, 24; breadth, 15.5; length of aperture, 9; of canal, 7; breadth of aperture, 7.

Localities.—"Gastropod-bed," River Murray Cliffs, near Morgan; lower beds at Muddy Creek.

SUBGENUS PHYLLONOTUS.

SYNOPSIS OF SPECIES.

Whorls quadrate, posterior slope lirate. 18. *M. Eyrei*.

Whorls convexly angular, posterior slope without liræ.

19. *M. sublævis*.

Whorls bicarinate on the anterior half. 20. *M. Legrandi*.

18. *Murex Eyrei*, T.-Woods. Plate iv., fig. 8.

M. Eyrei, Tenison-Woods., Proc. Roy. Soc., Tas., for 1876, p. 93.

Shell fusiformly ovate, with a somewhat high scalar spire, terminating in a small obtuse apex consisting of two smooth whorls. Whorls seven, of which those of the spire, excepting the two apical ones, are quadrate, the slightly upward sloping, posterior area about equalling in breadth the anterior part; last whorl sharply angulated postmedially. Varices seven to a whorl, thinly lamellose, narrow, often obsolete on the posterior area, which at the angle project into short hollow, slightly backward curved spines; on the posterior whorls they lose their lamellose character and become simple costæ, and finally devoid of spines.

The spiral ornament consists of slender equidistant threads, on the last whorl six occupy the posterior two-thirds next suture, those anterior to the angulation are stouter, nearly as wide as the intervening furrows. A rather broad space on either side of the angulation is devoid of liræ, but is closely finely spirally striated.

The transverse ornament consists of rather crowded lamellæ, which are raised into depressed, roundly arched, vaulted scales on the liræ.

Aperture rhomboid-ovate, angulated at the keel, outer lip thin with a crenulated edge. Canal open, about as long as the aperture, sinistrally arched, and somewhat recurved.

Length, 22; breadth, 10.5; length of aperture and canal, 14.

Localities.—Table Cape, Tasmania (*R. M. Johnston*!); lower beds at Muddy Creek, and blue clays at Schnapper Point, Victoria.

19. *Murex sublævis*, *spec. nov.* Plate iii., fig. 3.

Shell elongate-fusiform, with a high scalar spire; whorls seven and a half, convexly angular, equally sloping from the medial angulation to the sutures. Otherwise resembling *M. Eyrei*, but also differing by the stouter varices, the absence of liræ on the posterior slope of the whorls, fewer liræ on the anterior part of the body whorl, which is attenuated less abruptly into the beak. Inner lip faintly tuberculated within.

Length, 25; breadth, 12; length of aperture and canal, 14.5.

Localities.—Adelaide bore; and "Turritella clays," Blanche Point, Aldinga Bay.

20. *Murex Legrandi*, *Johnston*. Plate xi., fig. 8.

M. Legrandi, R. M. Johnston; Proc. Roy. Soc., Tasmania, for 1879, p. 32.

Shell fusiformly turriculate, whorls six (apex wanting), those of the spire bicarinate. Last whorl moderately convex, somewhat angulated in the posterior one-third, anterior to which are nine angulated spiral carinæ; the transverse ornament consists of thick distant threads forming slight granulations at points of intersection with the liræ. There are five varices on the last whorl, nine on the next, and increasing in number posteriorly; they are squamose, rather broad, irregularly disposed, and produced into short, vaulted, spiny scales on the posterior carination.

Aperture oval, peristome entire; outer lip with six stout denticulations within, situated anterior to the angulation at the carination. Canal much shorter than the aperture, open, sinistrally curved.

Length, 18; breadth, 8; length of aperture and canal, 9.5.

Locality.—Table Cape, Tasmania (*R. M. Johnston*!).

Has considerable resemblance to *M. cristatus*, Brocchi, but has fewer varices and liræ.

SUBGENUS OCINEBRA.

SYNOPSIS OF SPECIES.

- I. Spire whorls flat, varices squamose. 21. *M. biconicus*.
- II. Spire whorls convex.
 - Varices much arched; dense lamellose ornament. 22. *M. camplytropis*.
 - Varices slightly arched, spire longer; squamose liræ. 23. *M. asperulus*.
- III. Spire whorls subquadrate.
 - A. Embryonic whorls, trochiform, apex acute. 24. *M. trochispira*.

- b. Embryonic whorls rounded, apex obtuse.
- a. Varices very foliaceous, raised into spinulose squamæ. 25. *M. prionotus*.
 - b. Varices bluntly tuberculated at the shoulder. 26. *M. minutus*.
 - c. Varices without tubercles or elevated squamæ.
 - * Spiral threads on last whorl, thick, 10. 27. *M. crassiliratus*.
 - ** Spiral threads on last whorl, thin, 20. Outer lip not dentate within. 28. *M. alveolatus*.
 - Outer lip with three tubercles within. 29. *M. tridentatus*.

21. *Murex biconicus*, *spec. nov.* Plate i., fig. 3.

Shell elongate, triangularly ovate, with a low flat spire terminating in a small mamillate apex of two whorls. Whorls seven. Varices six, on the last whorl; lamelliform stout, raised into short vaulted scales over the spiral liræ, more conspicuously so on the shoulder of the whorl, posterior to which they are suddenly bent forward, and become almost lost in depressed extended lamellæ. The number of varices progressively increases posteriorly, at first appearing as nodulations at the anterior suture, and with the slightly increasing convexity of whorls acquiring the form of short costæ, ending posteriorly at the carination in blunt tubercles. Last whorl convex, angulated in the posterior third by the suddenly enlarged varices, between which the periphery is deeply undulate. On the rather high sloping posterior area there are about eight unequal slender spiral liræ; the shoulder is ridged medially, and finely striated on the flanks; on the anterior part there are about 12 angular liræ, alternating with an equal number of smaller ones. The furrows between the varices are obscurely transversely lamellated. The spire whorls are lirate and transversely lamellated.

Aperture large, oval; inner lip reflected over the columella; outer lip faintly lirate within. Canal wide open, shorter than the aperture, nearly straight.

Length, 34.5; breadth, 19; length of aperture, 15; width of aperture, 9; length of canal, 10.

Locality.—In a well sinking, River Murray desert.

22. *Murex camplytropis*, *spec. nov.* Plate iii., fig. 2.

Shell ovate, thick, with a moderately produced spire of somewhat convex whorls, terminating in a relatively large mamillated apex, consisting of one and a half smooth globose whorls. Spire whorls, excepting the apical whorls, varying from convex

to almost subquadrate, especially so in the examples from the River Murray cliffs; ornamented with about seven rounded, equidistant spiral liræ, and transversely by much curved varices and imbricating lamellæ of growth. Last whorl rather ventricose, ornamented with numerous spiral liræ, eight foliar varices and imbricating frilled lamellæ of growth.

In some examples the lamellæ are so dense as to conceal the spiral ornament.

Aperture rotund to oval; outer lip lirate within; canal shorter than the aperture, sinistrally bent, and somewhat recurved.

Length, 16; breadth, 9; length of aperture and canal, 11.

Localities.—Schnapper Point; lower beds at Muddy Creek; River Murray cliffs near Morgan; Table Cape (*R. M. Johnston*!)

23. *Murex asperulus*, *spec. nov.* Plate iii., fig. 1.

Shell elongate ovate; spire produced, terminating in a small mamillate apex of one and a half smooth whorls. Whorls six, convex or slightly shouldered, spirally lirate, and transversely varicose-plicate, and lamellose striated. There are about twelve thin, similar equidistant liræ on the penultimate whorl, which are raised into rather distant squamæ; varices eight to a whorl.

Aperture oval; canal about as long as the aperture, twisted, and recurved.

Length, 19.5; breadth, 9.5; length of aperture and canal, 10.5.

Localities.—Schnapper Point; lower beds at Muddy Creek; Aldinga Cliffs.

This species differs from *M. camplytropis* by its elongated shape, longer canal, simpler and straighter varices, and by the squamulose threads.

24. *Murex trochispira*, *spec. nov.* Plate iii., fig. 13.

Shell elongately ovate, with a rather high gradated spire terminating in an acute trochiform apex consisting of four smooth, flat, narrow whorls; the next three spire whorls quadrate and anteriorly bicarinate. Last whorl with a narrow sloping-upward area posterior to the angulation, anterior to which are six high angulated spiral carinæ, alternating with slender threads in the flattish, broad furrows.

The transverse ornament consists of rather distant lamellæ, raised into scales on the liræ and striæ. The varices are five on the last whorl, increasing in number posteriorly; they are lamellose, irregularly disposed, and produced into short, vaulted scales on the carinæ. Aperture oblong-oval, rather

abruptly contracted into a slightly curved, open canal, not so long as the aperture; peristome continuous; outer lip broadly crenulated on the margin.

Length, 10; breadth, 4.5; length of aperture and canal, 6.

Localities.—Lower beds at Muddy Creek; and River Murray Cliffs, Morgan.

The trochiform apex imparts a very distinctive character to this little *Murex*.

25. *Murex prionotus*, *spec. nov.* Plate i., fig. 5.

Shell ovate, with a moderate gradated spire, terminating in a small mamillate apex. Whorls seven, quadrate, those of the spire encircled with two strong erect ribs, which are crossed with fimbriated spirally finely striated lamellæ. There are usually two slender threads on the shoulder, one between the two strong ones in the middle of the whorl, and one or two at the anterior suture. Varices irregular, very foliaceous, raised into spinulose squamæ on the spiral ridges; there are six on the last whorl, but are about double in number on each of the succeeding whorls.

Aperture ovate, outer lip smooth within; canal much shorter than the length of the aperture, slightly recurved.

Length, 18; breadth, 9; length of aperture, 9.5.

Localities.—Adelaide bore; and Turritella clays, Aldinga Bay.

26. *Murex minutus*, *Johnston*. Plate x., fig. 14.

Murex minutus, R. M. Johnston, Proc. Roy. Soc., Tasmania, for 1879, p. 32.

Shell ovate-fusiform, with a moderately high gradated spire terminating in a mamillate apex of one and a half smooth rather high whorls. Whorls six, the anterior two and a half quadrately convex, the posterior ones becoming increasingly flatter. Last whorl sharply angled at the shoulder. Varices seven, elevated, stout, bluntly tuberculated at the shoulder; the posterior area has no liræ, but there are six stout squarose spiral liræ on the anterior portion. On the penultimate whorl there are eleven stout oblique rib-like varices, crossed by three thick equidistant liræ, one on the angulation and one near to the anterior suture.

Aperture quadrately-oval, abruptly contracted into a sinistrally arched, slightly recurved canal, about half the length of the aperture; outer lip thickened, obscurely dentate within.

Length, 8.5; breadth, 4.5; length of aperture and canal, 5.

Locality.—Table Cape, Tasmania (*R. M. Johnston*!).

27. *Murex crassiliratus*, *spec. nov.* Plate iii., fig. 5.

Shell similar to *M. alveolatus*, but the spiral liræ are thick, of which there are ten on the last whorl; the varices are more

elevated, four on the last whorl, obliquely continuous from whorl to whorl with an intermediate one on each of the following whorls.

Aperture oval, extending into a broad, open, nearly straight, slightly recurved canal, which is about as long as the aperture; margin of outer lip crenulated.

Length, 10; breadth, 5; length of aperture and canal, 6.

Locality—Upper beds at Muddy Creek (*J. Dennant*!)

28. *Murex alveolatus*, *spec. nov.* Plate iii., fig. 12.

Shell fusiform, spire moderately high of gradated whorls, terminating in a small blunt mamillate apex consisting of one and a half smooth whorls.

Whorls five and a half; those of the spire, excepting the apical ones, subquadrate, excavated at the suture. Varices squamose, narrow, except the last, which is moderately expanded, four on the last whorl, seven on the next two whorls.

The ornament consists of equidistant liræ. Tessellated by distant laminae, squamosely elevated at the intersections. On the last whorl there are two liræ on the posterior slope, thence to the base six stouter ones, with intervening threads.

Aperture oval, lirate within, terminating in a short, recurved open canal.

Length, 8.5; breadth, 4.5; length of aperture and canal, 5.

Locality.—Lower beds at Muddy Creek.

This resembles a diminutive *M. irregularis*; but apart from the difference in the number of varices, the canal is short and the transverse ornament more regular and closer. From young examples of *M. irregularis* it differs by its narrow lanceolate outline, short canal, smaller apex, and by its cancellated ornament.

29. *Murex tridentatus*, *spec. nov.* Plate ii., fig. 2.

Shell ovate of five and a half whorls, with a mamillate apex of one and a half small smooth whorls. Spire whorls ventricose, shouldered; truncated on the periphery by two stout, almost contiguous liræ.

Last whorl convex, ornamented with rounded, depressed, spiral liræ, of which there are about six on the posterior slope, four stouter ones on the angulation, and ten on the basal area; it has five varices, and is transversely striated with lamellæ of growth.

Varices squamosely laminar, obsoletely nodulous, five on the last whorl, and eight on the penultimate whorl.

Aperture rotund; outer lip thickened, with three stout tubercles within; canal very short, sinistrally curved.

Length, 10; breadth, 6; length of aperture, 3·5; of canal, 2·5.

Locality.—Turritella clays, Aldinga Bay.

GENUS TROPHON.

SYNOPSIS OF SPECIES.

I. Shell small, elongate fusiform.

Nuclear whorls almost unrolled, tip erect.

Whorls angulated, transversely lamellate.

1. *T. polyphyllus*.

Whorls angulated, plicate. 2. *T. brevicaudatus*.

Whorls ventricose, apical whorls gradated.

3. *T. torquatus*.

Nuclear whorls mamillate.

Whorls transversely lamellate.

Whorls convex; apex turbinate.

4. *T. icosiphyllus*.

Whorls gradated; apex subcylindrical.

5. *T. hypsellus*.

Whorls transversely plicate.

Aperture variced; liræ on penultimate whorl six, unequal.

6. *T. monotropis*.

No marginal varix; liræ 10, equal.

7. *T. mangelioides*.

II. Shell stout, oblong, purpuroid.

8. *T. anceps*.

SPECIES EXCLUDED.

T. succinctus, *T. Woods* is transferred to *Peristernia*.

1. *Trophon polyphyllus*, *T. Woods*.

Trophon polyphyllia, *T. Woods*. Proc. Lin. Soc., N.S.W., vol. iv., pl. ii., fig. 1, 1879.

Shell elongate fusiform, almost turriculate, thin, with a produced spire terminating in an acute apex composed of two and a half smooth rounded whorls, the extremity of which is erect.

Spire whorls three, excluding the nuclear ones, medially angular, and ornamented by numerous elevated lamelliform costæ (15 to 20 on the anterior whorl) which are raised into vaulted scales on the angulation of the whorl. On the penultimate whorl there is usually a spiral thread midway between the keel and the anterior suture, and often one at the suture which imparts a quadrate outline to this whorl.

The body whorl is roundly truncated in the middle, and is encircled with three stout threads; the lamellose costæ are continued on to the beak, the extremity of which is encircled with two threads.

Aperture roundly quadrangular; outer lip varicosely thickened and expanded, sometimes tuberculated within. Canal short, much curved to the left and reverted.

Length, 5·5; breadth, 2·5; length of aperture and canal, 2.

Locality.—Lower beds at Muddy Creek.

2. *Trophon brevicaudatus*, *spec. nov.* Plate ix., fig. 9.

Shell elongate, fusiform, almost turriculate, stout, with a produced spire, terminating in a subacute apex of two and a half smooth rounded whorls. Whorls below the apex, four, angularly curved in behind the anterior suture, and ornamented by narrow, angular, distant, subnodulose costæ, about 10 to a whorl; and by two strong liræ at the angulation and a thread at the anterior suture. Last whorl bluntly angled, faintly spirally lirate on the posterior slope; seven liræ on the rest of the surface extending to the beak; varicosely dilated behind the aperture; base abruptly contracted into a short, broad, slightly oblique and reverted beak. Outer lip thin, six-dentate within.

Length, 6; breadth, 2·5; length of aperture and canal, 3.

Locality.—Lower beds at Muddy Creek.

3. *Trophon torquatus*, *spec. nov.* Plate vi., fig. 2.

Shell elongate, fusiform, with a produced spire, terminating in an apex of two and a half or three smooth gradated, rapidly tapering whorls, the extremity of which is erect; a thin erect lamella encircles the carina of the apical whorls. Whorls, three or three and a half, excluding the nuclear whorls, ventricose and shouldered; the earliest whorl with three spiral liræ on the anterior two-thirds, increasing to four on the penultimate, equidistant, of which the posterior one is not so stout as the rest. Last whorl ventricose, gradually attenuated in front, with about 10 encircling threads. On each whorl there are about 20 lamelliform costæ, which produce square depressions by intercrossing with the liræ, where they are slightly squamosely elevated; on the body whorl, the costæ are continued on to the beak. Aperture variced; canal as long as the aperture.

Length, 8; breadth, 3; length of aperture and canal, 4.

Localities.—Turritella clays, Aldinga; and Adelaide bore.

4. *Trophon icosiphyllus*, *spec. nov.* Pl. ii., fig. 3.

Shell elongate fusiform, with a mamillate apex of one and a half whorls. Whorls four, excluding the embryonic ones, the two earlier whorls depressedly convex, costated; the penultimate whorl convex ornamented with five spiral liræ and about 20 lamelliform costæ, which undulate as they pass over the liræ and are sharply bent forward at the posterior suture.

Last whorl convex, gradually attenuated to the beak, with about 12 equidistant and equal encircling liræ, traversed by fimbriated lamellæ.

Aperture varicosely dilated; minutely tuberculated within the outer lip; canal shorter than the aperture.

Length, 7; breadth, 3; length of aperture and canal, 3.75.

Locality.—Adelaide bore.

Among living species this little fossil has considerable analogy with the European *T. Barvicensis* much more than to any Australasian species.

5. *Trophon hypsellus*, *spec. nov.* Pl. ii. fig. 1.

Shell elongate-ovate with a high gradated spire terminating in an elongate apex consisting of four smooth tumid whorls, regularly but rapidly diminishing in size, with a minute papillary extremity; whorls eight, those of the spire excluding the nuclear ones, convexly angular, bicarinate anteriorly. Last whorl ventricose with a narrow sloping area posteriorly, abruptly contracted into a short beak.

The spiral ornament consists on the spire whorls of two liræ; on the last whorl of one slender lira on the posterior slope, four stout liræ on the median portion, and four on the base.

The transverse ornament consists of about 16 lamelliform costæ to each whorl, which are raised into vaulted scales on the liræ, interstitial spaces between the costæ coincidently striated. The outer lip is varicosely thickened and expanded, and there is usually a second variceal development near to the columella margin and rarely a third on the penultimate whorl.

Aperture rhomboid, entire; outer lip varicosely thickened, five-tuberculated within. Canal very short and stout, open much curved sinistrally and reverted.

Length, 6; breadth, 3.5; length of canal and aperture, 3.

Localities.—Turritella clays, Aldinga Bay; and Adelaide bore (many examples).

In this species an approach is made to the genus *Triton*, through its two or three varices; but in its regular spire and general resemblance to the cohabitant species of *Trophon*, it may be better placed congenerically therewith. Its long sub-cylindrical apex is a striking specific mark of distinction, apart from the peculiarity of its variceal development.

6. *Trophon monotropis*, *spec. nov.* Plate iii., fig. 4.

Shell rather thin, elongate conical, with a high spire ending in a blunt rounded apex of two smooth whorls. Whorls four exclusive of the apical ones, convex or obscurely subquadrate; the last slightly tumid, with a rounded contracted base produced into a narrow sinistrally bent canal.

The transverse ornament consists of about 12 sharply-rounded costæ on each whorl and interstitial threads and striæ. On the body whorl the costæ are absent for some distance behind the aperture, and with the marginal varix are about seven in number. The spiral ornament consists of unequal threads, the more prominent of which rise into low blunt granulations in crossing the ribs; there are about five liræ on the penultimate whorl, of which four are more prominent than the rest. There are no proper varices except the broadly dilated one which margins the aperture.

Aperture oval, entire; outer lip thin in front of varix, four or five dentate within; inner lip thin, erect, smooth within. Canal narrow, bent a little to the left and slightly reverted, nearly as long as the aperture, almost closed.

Length, 9; breadth, 3·5; length of aperture and canal, 4·5.

Locality.—Clayey sands with green grains, Adelaide bore. (Sixteen examples.)

This species may not be a *Trophon*. The thin outer lip, not widely margined, removes it from *Murex*.

7. *Trophon mangelioides*, *spec. nov.* Plate x., fig. 11.

Shell thin, ovately fusiform, with a high spire ending in a blunt mamillary apex of two smooth whorls. Whorls four, exclusive of the apical ones, convex, but somewhat depressed round the upper part; the last somewhat tumid, with a rounded attenuated base, produced into a rather wide, long, twisted canal. The transverse ornament consists of about 12 stout, rounded, oblique costæ on each whorl; and the spiral ornament of equal and equidistant thin, elevated ridges, which are slightly thickened on the transverse ribs; there are about ten on the penultimate whorl, and those on the anterior part of the body whorl are broken up into granules.

Aperture elongate-oval; canal broad, twisted, and slightly reverted.

Length, 7·5; breadth, 3·75; length of aperture and canal, 4·5.

Locality.—Gastropod-bed of the River Murray Cliffs, near Morgan.

8. *Trophon anceps*, *spec. nov.* Plate ix., fig. 6.

Shell stout, oblong, biconical, with a high, subgradated spire. Whorls not less than five, posteriorly angulated and narrowly bicarinate in front; last whorl convex, with about 12 rounded costæ, encircled with about six principal liræ, which are cancelled with imbricating lamellæ. Aperture oval; outer lip regularly arched, its margin thin and wavy; canal short, somewhat compressed.

Length (incomplete), 19; breadth, 11; length of aperture and canal, 12.

Locality.—"Oyster banks," Aldinga Bay.

This purpuroid fossil is placed under *Trophon*, because of its close resemblance to the living *Purpura Flindersi*, Ads. and Angas, which Tryon has removed to *Trophon*, of which it has the characteristic operculum. From *T. Flindersi* it is distinguished by its elongate shape and rounded body whorl.

FAMILY PUFFURACEA.

GENUS RAPANA.

1. *Rapana aculeata*, *spec. nov.* Plate ii., fig. 8.

Shell pyriformly ovate, thick; whorls eight, spire moderately elevated, terminating in an obtuse apex consisting of two smooth globose whorls.

Whorls angularly convex, anteriorly truncated and bicarinated; last whorl ventricose, roundly and narrowly truncated on the periphery, abruptly attenuated into a short broad beak.

The transverse ornament consists of plications and closely-set appressed lamellæ. The number of costæ on the body whorl is seven, on the median portion of which they are high and narrow, but evanescent on the base of whorl, and anteriorly they are ill-defined angular ridges. There are usually eight plications on each of the spire whorls (excluding the apical ones). The plications are raised into vaulted scales on the posterior angulation, and in young shells the scales are elongated, reverted, hollow spines.

The spiral ornament consists on the spire whorls of slender threads much obscured by the transverse lamellæ; but a few distant liræ are conspicuous on the medial portion of the body whorl. Aperture ovate, peristome continuous; outer lip somewhat flatly expanded anteriorly, lirately ridged within anterior to the carination of the whorl; inner lip erect, concave medially. Umbilical fissure margined by an elevated rounded keel.

Immature shells of about 30 millimetres are exceedingly like *Murex Eyrei*, and are imperforate; they may be distinguished by the larger pullus, the higher sloping posterior area of the whorls, and the few stouter liræ on the anterior part of the body whorl.

Length, 50; breadth, 34; length and breadth of aperture, 21 and 14; length of canal, 12.

Localities.—Blue clays at Schnapper Point and lower beds at Muddy Creek, Victoria.

GENUS PURPURA.

1. *Purpura (Trochia) abjecta*, *spec. nov.* Plate xii., fig. 8.

Shell stout, with a short spire and large ventricose body whorl, which is ornamented with linear encircling furrows, either crowded or irregularly disposed, or with narrow flat sulci as wide or wider than the flat liræ; at the base the linear furrows are increasingly distant. There are also obsolete transverse plications and lamellæ of growth. The aperture is large and oval, with a deep short oblique groove at the front; the outer lip is simple, but stoutly lirate within; columella broadly and deeply patulous. Height of body whorl, 35; breadth, 26; height of aperture, 27.

Locality.—Upper beds at Muddy Creek (*J. Dennant!*).

The material available for description is not only limited, but is imperfect; though, nevertheless, indicating a species allied to *P. textiliosa*, differing from it especially by the fine revolving liræ. The species is of interest as the sole representative of the genus in the older tertiary strata of Australia.

GENUS VITULARIA.

1. *Vitularia curtansata*, *spec. nov.* Plate vi., fig. 4.

Shell rather thin, biconical, ventricose, oval. Whorls five, rather convex, impressed at the suture. Last whorl ventricose, gradually attenuated anteriorly into a short blunt canal.

Spire whorls ornamented with about six stout, rounded, scaly, spiral ribs, that next but one to the anterior suture a little stouter than the rest, and producing a slight angulation of the whorl; the alternating furrows are deep, narrower than the ribs. The transverse ornament consists of about 10 inconspicuous plications. Body whorl with about 20 unequal spiral ribs.

Aperture pyriform, straight; peristome thinly continuous; inner lip patulous, slightly arched to the origin of the straight pillar, with a thin edge parting the aperture from the umbilical fissure; outer lip smooth within. Canal very short, wide, and truncated.

Length, 12; breadth, 8; length of aperture and canal, 7.

Locality.—Lower beds at Muddy Creek.

GENUS RICINULA.

1. *Ricinula subreticulata*, *spec. nov.* Plate xii., fig. 7.

Shell small, acutely ovate, biconical, rather thick. Whorls five, those of the spire nearly flat, slightly angular, and nodulate over the anterior suture; last whorl nodosely carinated, and somewhat narrowly truncated in the middle.

The ornament consists of stout spiral threads, narrower than the flat intervening sulcations, and of transverse stout striæ, which form shallow pitted square interstices by the intercrossing of the liræ.

The number of nodulations on the body whorl is six, increasing to eight on the penultimate. The spiral liræ on the posterior slope of the body whorl are four or five in number, and about ten anteriorly.

Aperture large, oval; outer lip externally simple and sub-angulated medially, internally with seven stout liræ; canal very short, wide, and truncated.

Length, 9.5; breadth, 6; length of aperture and canal, 5.

Locality.—Upper beds at Muddy Creek.

The living analogue of this species is *Purpura reticulata*, Quoy and Gaimard, inhabiting Southern Australia, from which it differs by the stronger spiral costulation, more open cancellation, stouter tubercles, by the greater breadth of the last whorl, which is somewhat abruptly contracted into the beak, and consequently by the more angulated aperture. In the living species the last whorl gradually tapers anteriorly, and the internal liræ on the outer lip are not so strongly developed as in the fossil.

SPECIES EXCLUDED.

R. purpuroides, Johnston, is transferred to *Pisania*.

FAMILY TRITONIDÆ.

GENUS RANELLA.

1. *Ranella Prattii*, T. Woods. Plate vi., fig. 6.

Triton Prattii, T. Woods, Proc. Lin. Soc., N.S.W., vol. iii., p. 223, t. 21, f. 15, 1878.

Shell ovate, conical, very contracted at the base into a short, recurved, somewhat twisted snout. Apex obtuse, consisting of two and a half polished, rounded, rapidly-increasing whorls. Whorls six, exclusive of the embryonic whorls, compressed, ventricose, rounded, with a deep narrow undulated suture, of regular increase; but the last is disproportionately large, its base is rounded but contracted, and a little flattened towards the beak. Varices in two rows, one on each side, slightly imbricating in each row, almost continuous and axial, convex, compressed, and elevated. Posterior whorls tessellated by transverse costulæ and spiral liræ; on the anterior whorls the intervariceal transverse plications are gradually reduced in number, and finally to four. On the body whorl the spiral ridges are six in number, equal and equidistant, with five or more flat threads in the interspaces, cancellated by transverse raised lines.

Aperture oval, rather small, perpendicular; peristome continuous; outer lip, its nearly semicircular curve angulated by the projection of the six stouter liræ; inner lip slightly but narrowly spreading, with two or three inconspicuous callosities near its junction with the pillar.

Length, 29; breadth within the varices, 20; length of aperture 9, of canal 7.

Localities.—Lower beds at Muddy Creek; blue clays at Schnapper Point; and "Gastropod bed" of the River Murray Cliffs, near Morgan.

Triton Prattii was founded on immature specimens of what proves to be a *Ranella*, belonging to the subgenus *Argobuccinum*, characterised by an elevated spire, short beak, and the absence of a posterior canal; and I have thought it needful to describe and figure an adult example. The species is related to *R. bitubercularis*, Lamarck, of the Indo-Pacific region, from which it differs by being multicostated and not bi- or trituberculated between the varices.

GENUS TRITON.

SYNOPSIS OF SPECIES.

I. Body whorl with a sharp keel, crenately-serrated on the margin.

Ovate; body whorl with an anterior row of serratures.

Intervariceal serratures, 6; posterior slope cancellated.

1. *T. Abbotti*.

Intervariceal serratures, 6; posterior slope smooth.

2. *T. radialis*.

Ovate; body whorl without a second row of serratures.

Spire whorls flat or slightly imbricating at the suture; liræ smooth.

3. *T. gibbus*.

Spire whorls with a narrow anterior slope; liræ granulose.

4. *T. cyphus*.

Elongate; body whorl with an anterior row of serratures, intervareiceal serratures 6, blunt.

5. *T. Woodsii*.

Elongate; body whorl without a second row of serratures, intervareiceal serratures 5, cuneate.

6. *T. textilis*.

II. Body whorl subquadrate, nodulate on the keels; shell ovately fusiform.

Three rows of tubercles; posterior rows with slender oblique costæ.

7. *T. intercostalis*.

Two rows of tubercles; seven intervareiceal tubercles on the posterior angulation.

8. *T. annectans*.

Tubercles of the two rows confluent, four between the varices.

9. *T. armatus*.

III. Body whorl convex, without costæ, nodulate on the periphery.

Shell ovate, one row of nodulations, moderately ventricose; liræ flat, granular. 10. *T. ovoideus*.

Gibbous; liræ elevated, undulous. 11. *T. tumulosus*.

Shell ovately fusiform, three rows of nodulations on body whorl. 12. *T. tortirostris*.

Shell elongate-fusiform, feebly angled and nodulate at the periphery. 13. *T. protensus*.

IV. Body whorl convex, costated.

Shell elongate-fusiform, six intervariceal costulations. 14. *T. cribrus*.

Shell elongate-ovate, five or six stout, high, intervariceal costæ. 15. *T. crassicostatus*.

Shell subturreted.

Intervariceal costellæ, 10; primary liræ on last whorl, 6. 16. *T. oligostirus*.

Intervariceal costellæ, 15; liræ, 16. 17. *T. gemmulatus*.

Intervariceal costæ, 10; primary liræ, 4. 18. *T. Quoyi*.

Intervariceal costæ, 6; liræ, 4. 19. *T. sexcostatus*.

SPECIES EXCLUDED.

T. Prattii, *T. Woods*, is transferred to *Ranella*.

T. Tasmanica, *R. M. Johnston*, is transferred to *Epidromus*.

1. Triton Abbotti, *T. Woods*.

T. Abbotti, Tenison Woods, Proc. Roy. Soc., Tasm., for 1874, t. 1, f. 8, p. 24.

Shell elongately-ovate; spire high, slightly distorted, terminating in a subcylindrical obtuse apex, consisting of four and a half polished, rounded, faintly lirate, and transversely striated whorls. Whorls five and a half, excluding the nuclear whorls, carinated and tuberculated on the keel; spirally lirate and transversely distinctly striated; the liræ obscurely flatly granulated, unequal.

Varices at about four-fifths of a whorl, tuberculated at the carination.

Body whorl triangulated, the posterior carination with six large wedge-shaped intervariceal tubercles, the anterior angulation with about five small intervariceal tubercles, becoming smaller and finally obsolete towards the marginal varix.

Aperture ovate; outer lip denticulated within; inner lip thin, reflected over the columella, with small transverse corrugations. Canal not quite so long as the aperture; very much reverted.

Length, 55; breadth, 30; length of aperture and canal, 29.

Locality.—Table Cape (*Hobart Museum!* and *R. M. Johnston!*)

2. *Triton radialis*, *spec. nov.* Plate v. fig., 8.

Shell acutely ovate, with a high, sloping, distorted spire terminating in an acute apex, consisting of two polished whorls, the anterior one slightly shouldered, or bicarinate, the posterior whorl ends in a blunt, short, erect, lateral point. Whorls five, excluding the nuclear whorls, flat, angulated over the anterior suture; the carination broadly and deeply crenate-dentate. The surface ornamented with spiral threads, increasing from six on the posterior slope of the earliest whorl to about 30 on that of the body whorl, but at the same time they gradually diminish in strength, until they are barely visible to the unaided eye. Base of the body whorl similarly sculptured, but with two strong liræ, and three or four on the beak.

Varices at about four-fifths of a whorl, deeply and broadly crenately-serrated at the carination. There are four or five large intervariceal serratures on the posterior carination, and three smaller ones on the anterior carina of the body whorl, becoming obsolete at half the length between the varices. Aperture ovate; outer lip lirate within; inner lip thin, erect, lirate within, beak shorter than the aperture, abruptly bent to the right, and reverted.

Length, 40; breadth, 28; length of aperture and canal, 24.

Locality.—"Gastropod-bed" of the River Murray cliffs, near Morgan.

This Murray fossil might at the first glance be taken for *T. Abbotti*, but it has fewer and larger tubercles, which produce a greater distortion of the spire, whilst the posterior slope is much broader and very feebly lirate and not cancellate on the last whorl, which is moreover not at all or but feebly biangulated; the shell is proportionately wider, the canal shorter, and the apex is very different.

3. *Triton gibbus*, *spec. nov.* Plate v., fig. 9.

Shell biconical, with a short distorted spire of flat whorls, imbricating and crenately-dentate at the suture. Last whorl bisected by a very high, sharp, crenately-dentate keel, with a precipitous anterior slope, and the base contracted into a broad, twisted, and reverted beak.

Whorls five (excluding two smooth apical ones ending in a laterally-elevated, obliquely-truncated point), with a varix at about four-fifths of a whorl, much depressed or almost concave for the anterior third of each intervariceal space. Intervariceal crenulations five, confined to the posterior two-thirds of

the space, whilst the anterior one-third is encircled with a series of small bifid granulations.

The ornament consists of flexuous slender spiral threads, crossed by close fine striæ. The encircling threads are alternately large and small, those on the base of the last whorl, and especially towards the marginal varix, are broken up into elongate granules. Aperture rhomboid; outer lip lirate dentate within; inner lip thinly spread over the columella, which shows a strong curved fold at its junction with the canal.

Length, 35; breadth, 25; height of aperture, 14; length of canal, 10.

Localities.—Blue clays at Schnapper Point; and lower beds at Muddy Creek.

This remarkable gibbous species has the same general characters of *T. textilis*, from which it differs in shape, more trochiform spire, shorter canal.

4. *Triton cyphus*, *spec. nov.* Plate v., fig. 11.

This is another gibbous species, differing from *T. gibbus* by its subscalar spire-whorls and its stout, broad, crenately-granulated, spiral liræ. On the base of the last whorl the principal liræ are about eight in number, the posterior one of which is a little stronger than the rest, and have two, three, or four slender threads in the interspaces. There is no columella fold as in *T. gibbus*.

Length, 39; breadth, 25; height of aperture, 16; length of canal, 8.

Localities.—Lower beds at Muddy Creek; blue clays at Schnapper Point.

5. *Triton Woodsii*, Tate. Plate v., fig. 4; Var. pl. v., fig. 6.

T. Woodsii, Tate, Proc. Lin. Soc., N.S.W., vol. IV., p. 15; t. 3, f. 1-2; 1879.

Elongate fusiform, with a much produced conical spire; apex acute of two and a half whorls, the anterior one angular, the next rounded and very narrow, terminating in an acute curved lateral point. Whorls six, excluding the apical ones, sharply angulated medially, but rather flatly depressed behind each varix; keel with six bluntish tubercles between the varices. Varices rather broad, convex axially, without tubercles, ornamented as the rest of the surface, situated at about four-fifths of a whorl.

Last whorl somewhat tumid, biangulated; the anterior keel with six rounded small tubercles, which become obsolete towards the marginal varix.

Surface ornamented with numerous slender spiral threads, for the most part, equal and equidistant; cancellated by close,

fine, raised lines. There are about 20 liræ on the posterior slope of the last whorl, of which one median and one or two near the suture are stouter than the rest, and irregularly granulose; the anterior part is similarly ornamented.

Aperture quadrately oval; outer lip tuberculate within; inner lip erect, with a tubercle at the point of the pillar, to which is opposed a stout tubercle on the outer lip; canal long, much recurved.

Length, 37; breadth, 17; length of aperture 9, of canal 12.

Locality.—Lower beds at Muddy Creek.

T. Woodsii was founded on an immature example, which does not so characteristically represent the species as the adult specimen which is here figured.

Var.—The specimens from the River Murray Cliffs and Schnapper Point are much larger, and the liræ usually more granulated. Length 50, breadth 26, length of aperture 18.

6. *Triton textilis*, *spec. nov.* Plate v., fig. 12.

Elongate-fusiform, with a much produced conical spire; apex acute of three rounded lirate whorls, ending in an acute upward-curved point.

Whorls six, excluding the embryonic ones, with a high ante-median serrate-dentate carination; but much depressed behind each varix, and with the sudden enlargement in front of it there is produced considerable distortion of the spire. Last whorl medially angulated, with an almost precipitous slope anteriorly.

Surface ornamented with numerous (about 30 on the posterior slope of last whorl) flat, equal, spiral threads, with a little wider interspaces, cancellated by close, fine, raised lines.

Varices rather broad, concave axially, rather acute, without tubercles, and ornamented as the rest of the surface, situated at about four-fifths of a whorl. The intervariceal nodulations vary from six to eight, decreasing in size anteriorly.

Aperture oval; outer lip with a sharp, minutely-wrinkled margin, with an inconspicuous dentate, with ridge within, abruptly terminating at the canal; inner lip erect, with a few corrugations anteriorly, and a small tubercle at the point of the pillar. Canal long, much recurved.

Length, 37; breadth, 20; length of aperture and canal, 22.

Localities.—Blue clays at Schnapper Point; and lower beds at Muddy Creek.

This species very much resembles *T. Woodsii*, but is more distorted, the whorls more angularly elevated, by the absence of an anterior carination on the body whorl, and by the more numerous spiral liræ.

7. *Triton intercostalis*, *spec. nov.* Pl. ix., fig. 5.

Shell elongate-ovate; whorls, five (apex unknown), the earlier ones, convex, with five principal granulose liræ, finely reticulated in the furrows; the anterior ones bicarinated and tuberculated and reticulated all over.

Last whorl roundly truncated medially, and abruptly attenuated into a stout, long, twisted beak; the whole surface closely reticulated by transverse raised lines and stronger spiral liræ. The medial part is encircled with three equidistant, tuberculated keels; the posterior one is the stoutest, and the anterior one, which is the weakest, is in an alignment with the posterior angle of the aperture. The tubercles of the two posterior ones are confluent, and are continued backward as a narrow arched costulation to the suture; the intercostal space is occupied by two similar costulations, ending anteriorly at a strong subnodulated thread which bisects the posterior slope. The basal part of the last whorl has two equidistant, strong, granular liræ.

Varices narrow, rather broadly expanded, crenulated on the margin, at three-fifths of a whorl. The inter-variceal nodulations are seven in number on the two posterior rows, and ten on the anterior row.

Length, 43; breadth, 28; length of aperture, 17; of canal, 10.

Locality.—Lower beds at Muddy Creek (*J. Dennant*!)

This species is very distinct through its obliquely costated posterior slope and the unusually narrow intervariceal areas.

8. *Triton annectans*, *spec. nov.* Pl. v., fig. 3.

Shell resembling *T. cyphus* with the whorls medially subangular, spire less distorted and higher, last whorl subquadrate, encircled with two rows of nodulations. The nodulations on the posterior angulation are large, seven on each intervariceal space, but diminishing in size anteriorly; the eleven nodulations on the anterior angulation are small, though conspicuous, equal sized and regular disposed. Posterior slope of last whorl with about twelve irregular encircling liræ, the larger ones more or less granulose.

Length, 38; breadth, 21; length of aperture, 14.5; of canal, 9.5.

Locality.—Lower beds at Muddy Creek.

9. *Triton armatus*, *spec. nov.* Plate v., fig. 3.

Ovate-elongate; whorls five and a half (apex not known), carinated and acutely nodulose, equally spirally lirate; liræ thin, depressed, about ten on the posterior slope and five on the front of the penultimate whorl. Varices broad, high, and spinosely nodulate on the carination.

Last whorl ventricose, narrowly truncated and bicarinated at the periphery, with four intervariceal nodulations, those of the anterior row confluent with the corresponding ones behind, and continued backward as oblique, broad undulations, becoming evanescent before reaching the suture. Base with a strong encircling thread, equidistant with the two carinations.

Aperture oval; outer lip smooth within, flatly and narrowly expanded, continuous with the smooth inner lip which is broadly reflected over the columella; aperture contracted in front by a columella fold, and a stout ridge opposed to it on the outer lip. Beak with a very broad depressed base, twisted and reverted.

Length, 41; breadth, 24; length of aperture, 13; of canal, 12.

Locality.—In a well sinking in the Murray Desert.

This species is not much unlike *T. annectans*, but differs by the shape and fewness of the intervariceal nodulations.

10. *Triton ovoideus*, *spec. nov.* Plate ix., fig. 4.

Shell ovate, with a short, broad, conical spire; apex obtuse? Whorls four (incomplete), rounded, slightly angled at the anterior suture, and furnished at the angulation with six small rounded intervariceal nodulations; encircled throughout with flattened beaded ridges, alternating with very narrow simple threads. Varices six, at about four-fifths of a whorl, rounded, convex axially, and ornamented as the rest of the surface.

Columella arched, furnished with an obliquely axial, elongate callosity at the posterior angle, and with tooth-like ridges at the front.

Canal very short, much bent to the right, and slightly reverted. Outer lip thickened, with seven strong denticulations within, the anterior one much larger than the rest.

Length, 23 (estimated, 24.5); breadth, 14; length of aperture and canal, 14.

Locality.—Upper beds at Muddy Creek (*J. Dennant*!).

A species exceedingly like *T. Bassi*, Angas, but conspicuously distinct by its broader and fewer (about half the number) liræ, and consequently by the fewer and stouter denticulations on the outer lip; moreover, the spire whorls are more angular, the nodulations smaller; the aperture is oblique, and the canal more twisted.

11. *Triton tumulosus*, *spec. nov.* Plate v., fig. 2.

Shell ovately conical, with a moderately high distorted spire of subgradated whorls. Apex of two polished whorls; the anterior one is high, bicarinated, and transversely striated; the posterior one, encircling a shallow concavity, at first sud-

denly narrowed, then somewhat depressedly dilated, and ending in a blunt appressed point.

Whorls five, excluding the embryonic ones, convex, rather tumid in front of and depressed behind each varix; ornamented with a median row of stout granulations, anterior to which are three very broad, rounded, nodately undulose encircling ridges, and two similar ones at the front, with a stout thread in each interspace; the whole surface traversed by close-set striæ.

Last whorl ventricose, with numerous liræ alternately stout and slender on the anterior portion, the primary liræ with distant, elongate, depressed granules.

Varices at four-fifths of a whorl crenulated by the liræ; intervariceal nodulations seven.

Aperture ovate; outer lip lirate; inner lip corrugated, slightly angulated in front; canal of moderate length,* shorter than the aperture, oblique, and strongly reverted.

Length, 42; breadth, 24; length of aperture, 15; of canal, 10.

Localities.—Lower beds, Muddy Creek; blue clays, Schnapper Point.

T. tumulosus has a general resemblance to *T. cyphus*, but differs in shape of whorls and in the spiral ornament. Among living species it has some affinity with *T. subdistortus*, from which it differs by its shorter spire, long canal, and the gross spiral sculpture.

12. *Triton tortirostris*, *spec. nov.* Plate v., fig. 7-

T. minimum, Tenison Woods, Proc. Roy. Soc., Tasm., for 1876, p. 107 (non Hutton).

Shell ovate, with a high conical distorted spire; apex globose of four rounded whorls, ending in a very small depressed tip. The anterior whorl is obtusely angled above and medially, and is transversely striated.

Whorls six, excluding the apical ones, rounded, obscurely angulated and tuberculated; last whorl rather tumid, abruptly contracted at the base into a broad, short, dextrally bent and reverted beak. The last whorl in young specimens is narrowly truncated on the periphery.

Surface ornamented with unequal, depressed, spiral liræ, broken up into elongate granules and transverse striæ; there are from six to eight liræ on the posterior slope of the spire whorls. Varices rather broad, convex axially, without tubercles, the liræ which pass over them are granulated at the intercrossing by strong transverse threads; situated about four-fifths of a whorl.

The periphery between the varices on the last whorl with a

*The canal of the figured specimen is incomplete.

row of five trifold nodulations; the anterior row, which is in an alignment with the posterior angulation of the aperture, is weaker and separated by a wider interspace than that which intervenes between the two equal and posterior ones; base with two inequidistant strong subnodulous liræ.

Aperture oval, oblique; outer lip with a sharp erect margin, denticulate within; inner lip broadly reflected on the columella, smooth, with an oblique anterior fold and bearing three denticles at the end.

Length, 49; breadth, 27.5; length of aperture, 17; of canal, 11.

Localities.—Blue clays at Schnapper Point; in the lower beds at Muddy Creek; and gastropod-bed of the River Murray-cliffs, near Morgan; Table Cape (*R. M. Johnston*!)

This species though partaking somewhat of the general form of *T. Woodsii* is readily separable by its rounded apex, trifold nodulations, in which latter character it approaches *T. intercostalis*, but is otherwise very different.

T. minimum, Tenison Woods, was established on a specimen of 11 mills. long. This I have had under observation, as also another example of 18 mills. in length. Both agree perfectly with the young of corresponding size of *T. tortirostris*. As the specific name had already been employed by Hutton in 1873 for a dissimilar New Zealand fossil, I have imposed a new designation.

I cannot concur with the opinion of Prof. Hutton, Proc. Lin. Soc., N.S.W., p. 481, 1886, that this species, Murray-examples of which under the M.S. name of *T. pseudospengleri* had been examined by him, is the same as *T. minimus*, Hutton, of which I have before me authentic specimens.

13. *Triton protensus*, *spec. nov.* Plate v., fig. 10.

Shell turriculate-fusiform; apex obtuse, of about two narrow smooth whorls, of which the posterior one at first overhangs the other, thence rapidly attenuated to a small incurved depressed point. Whorls five, excluding embryonic ones; the earlier ones flatly convex; the last one and a half whorls feebly angulated medially, and there feebly nodulated.

The ornament consists of flat narrow spiral threads, with wider interspaces, cancellated by moderate closed slender threads, producing on the earlier whorls minute granulations at the intersection. Varices at about four-fifths of the whorl, broad, elevated, ornamented as rest of the surface; the inter-variceal nodulations five in number. Outer lip feebly denticulated within; base of the columella with a few corrugations; canal as long as aperture, reverted.

Length, 29; breadth, 11; length of aperture and canal, 16.

Locality.—Lower beds at Muddy Creek.

This species is more lanceolate than *T. Woodsii*, with convex whorls; though having the same form of ornament, it has the anterior convexity of the last whorl uninterrupted, and the nuclear whorls are different.

14. *Triton cribrosus*, *spec. nov.* Plate v., fig. 5.

Shell elongate-fusiform, with a very high, gradually attenuated spire of eight gradated whorls, terminating in an apex of two and a half rounded whorls, with a very small mamillate tip, the anterior whorl globose and finely spirally lirated.

Spire whorls, excepting nuclear ones, convex, narrowly truncated at the periphery by two stout flat ridges, and the posterior slope broader and less abrupt than the anterior slope; a moderately strong post-medial ridge encircles the posterior slope, and there is a similar one at the anterior suture. The concave interspaces are encircled each with two or three similar but smaller threads. The whole surface crossed by thin, six or seven, intervariceal costulations which are knotted at the junctions with the liræ, and distantly transversely striated.

Varices at about four-fifths of a whorl, compressed, rather high, with four broad crenate-serratures.

Last whorl quadrately convex, somewhat rapidly attenuated into a long, slightly curved and reverted beak; feebly costulated on the base. Outer lip sulcated within; inner lip thinly and narrowly adpressed over the columella; columella slightly arched, with an oblique ridge terminating at the point of the pillar. Canal as long as the aperture, rather narrow, slightly bent to the right, and reverted.

Length, 34; breadth, 15; length of aperture and canal, 18.5.

Locality.—Clayey green-sands, Adelaide bore.

15. *Triton crassicostatus*, *spec. nov.* Pl. xi., fig. 4.

Shell elongate-ovate, with a moderately high regular spire of eight gradated whorls, ending in a mamillate apex of about four rounded smooth whorls, with the tip very small and slightly exsert.

Spire whorls (excepting nuclear ones) of regular rapid increase, slightly concave at the shoulder, angulated at the keel, with a very slight contraction towards the anterior suture. Ornamented with about ten equidistant flatly rounded liræ; the intervening much broader furrows closely and sharply transversely striated. The transverse ornament consists of six intervariceal costæ, which are raised into blunt serratures on the keel; the varices are compressed, elevated, crenulated on the margin, situated at two-thirds of a whorl.

Last whorl convexly quadrate, very much contracted at the base; with five intervariceal costæ, thick and high at the periphery, evanescent on the base; base with two prominent equidistant liræ, and intervening threads. The liræ on the last whorl are more or less granulated, especially towards the marginal varix and base.

Aperture sub-rotund; peristome continuous; the almost semicircular sharp outer lip slightly interrupted by the projection of the four principal liræ, obscurely denticulated; inner lip erect, with a sharply twisted columella plait at the base. Canal incomplete, apparently sharply bent and reverted.

Length, excluding canal, 24; breadth, 15·5; length of aperture, 9.

Locality.—Table Cape, Tasmania (*R. M. Johnston* !)

This species has some resemblance to the young of *T. Spengleri*, but the whorls are more angulated, and the transverse ornament is different.

16. *Triton oligostirus*, *spec. nov.* Plate vi., fig. 7.

Shell elongate-oval; apex mamillate of two and a half small rounded whorls, the tip depressed. Whorls eight, convex, with six principal encircling liræ, feebly costated transversely (ten between the varices); the intercostal spaces are latticed by the intercrossing of spiral threads and stout, distant, elevated striæ; the costæ are feebly granulose, but more conspicuously on the two median and on the posterior of the principal liræ.

Last whorl ventricose, with a rounded base; spirally lirate, and tessellated all over. The costæ are slender, arched, and do not extend on the base, feebly nodulo-granulate; base with two or three principal liræ, which are broken up into elongate, flat granules.

Outer lip toothed; columella denticulated at the front.

Length, 17·5; breadth, 9.

Localities.—Adelaide bore; and Turritella-clays, Aldinga Bay.

This is another species of the Quoyi-group, from which it is distinguished by the numerous spiral liræ, slender costæ, and tessellated ornament.

17. *Triton gemmulatus*, *spec. nov.* Plate vi., fig. 8.

Shell turriculate, with a distorted spire of seven convex whorls, ending in a large blunt apex of two and a half smooth whorls, with a tip very small and rather depressed. Spire whorls (excepting the apical ones) irregularly convex, being ventricose in front of, and nearly flat behind, each varix; ornamented with about 16 unequal liræ, of which there are two

prominent ones on the periphery, crossed by about 15 faint intervariceal costulations which bear bead-like granulations at the intersections; the intercostal spaces distantly transversely striated.

Varices eight, at intervals of about four-fifths of a whorl, stout, broad, crossed by the liræ, and axially striated.

Last whorl convex, with a rounded base contracted into a short twisted beak; ornamented same as that of the spire, except that the transverse striations cut up the surface of the liræ into small granulations.

Aperture subrotund, entire; outer lip with an acute crenulated margin, lirate within; inner lip reflected, smooth, with an oblique fold at the front.

Length, 13; breadth, 6; length of aperture, 4; of canal, 2.

Locality.—Lower beds at Muddy Creek.

This fossil belongs to a group typified by the recent *T. Quoyi*, Reeve, but it is more slender, has a larger apex, finer ornament, longer canal, and a smooth inner lip.

18. *Triton Quoyi*, *Reeve*.

T. Quoyi, *Reeve*; monograph of *Triton*

This species, so common on the southern shores of Australia, is known to me as a fossil by several specimens from the upper beds of the Muddy Creek section

19. *Triton sexcostatus*, *spec. nov.* Plate vi., fig. 9.

Turriculate; whorls nine, ending in a small obtuse apex of two rounded whorls; spire whorls convex, the earlier ones subquadrate, ornamented with four spiral ribs, acutely nodulated by the intercrossing of transverse costæ, of which there are six between the varices. Outer lip prominently toothed; columella with three rounded tubercles.

Length, 21; breadth, 9.5,

Locality.—Oyster banks at Blanche Point, Aldinga Bay.

This fossil closely resembles *T. Quoyi*, from which it is conspicuously different by its larger, fewer, and more distant intervariceal costæ, which number in the recent species from 10 to 11, whilst there are invariably six on the fossil.

GENUS EPIDROMUS.

SYNOPSIS OF SPECIES.

Whorls equally attenuated in front and behind.

Surface granulated all over by the intersections of equal and equidistant liræ (12) and costæ.

1. *E. tenuicostatus*.

Liræ 14, rather unequal, closer together than the costæ; nodular-granulose on the larger liræ.

2. *E. nodulatus*.

Liræ six; costæ wide apart; granulose; apex hemispheric.

3. *E. Tasmanicus*.

Costæ simple, interstices spirally striated.

4. *E. citharellus*.

Surface cancellated, but not granulated.

5. *E. leptoskeles*.

Whorls shouldered, especially the earlier ones.

Intercostal spaces rugosely striated; apex large, hemispheric.

6. *E. texturatus*.

Intercostal spaces microscopically striated; apex subcylindrical.

7. *E. turritus*.

1. *Epidromus tenuicostatus*, T.-Woods. Plate vi., fig. 12.

Pisania tenuicostata, Tenison-Woods, Proc. Lin. Soc., N.S.W., vol. iii., p. 224, t. 20, f. 6, 1878.

Shell elongate-fusiform; whorls eight, convex; nuclear whorls two, smooth, shining, ending in a very small suberect papillary tip; the third or fourth whorls shining, ornamented with slightly flexuous crowded transverse ribs; the rest of the whorls cancellated by equal and equidistant transverse and spiral ribs, stoutly granulose at the intersections. About 40 transverse ribs on the last whorl, and about 12 spiral ribs on the penultimate whorl.

Varices eight, somewhat irregularly disposed, broad, crenulated on the margin.

Aperture narrowly oblong; canal very short, slightly twisted and reverted; outer lip dentate liræ within; inner lip reflected on the columella, smooth.

Length, 15; breadth, 5; length of aperture and canal, 6·5.

Localities.—Lower beds at Muddy Creek; gastropod-bed of the River Murray Cliffs, near Morgan.

The examples from the latter locality offer such differences from the type as to suggest a distinct species; in them the third whorl from the summit is prominently ventricose, producing a turbinate apex, and the transverse ribs on it are stout and wide apart.

2. *Epidromus nodulatus*, spec. nov. Plate vi., fig. 11.

Shell turriculate; whorls seven and a half, moderately convex; nuclear whorls one and a half, globose, smooth, with the tip immersed. Ornamented with somewhat unequal revolving liræ (14 on the penultimate whorl) and narrow, rounded, curved, transverse riblets (about 22 on the penultimate whorl); the riblets are narrower than the interspaces, which are transversely striated, and are slightly nodulate at the intersections.

with the liræ. Varices nine, compressed, elevated, transversely striated, and crenulated by the liræ which pass over them.

Aperture narrowly oblong; outer lip lirate within, liræ continued to the margin, which is crenulate; inner lip widely expanded and subreflected.

Length, 19; breadth, 7; length of aperture and canal, 8.

Locality.—Clayey green-sands, Adelaide bore. Three examples.

3. *Epidromus Tasmanicus*, Johnston. Plate xi., fig. 11.

Triton Tasmanicus, R. M. Johnston, Proc. Roy. Soc., Tasm., for 1879, p. 33.

"Shell narrow, turreted, with elevated spire, and round blunt apex; whorls eight, cancellated and ornamented with about 24 fine riblets and two broad round distant varices on each whorl, which become slightly granulose at points where intersected by the more faintly raised regular carinæ, six of the latter visible on the upper whorls; interspaces, varices, carinæ, and riblets finely transversely striate throughout; aperture entire, ending in a short canal; outer denticulate interiorly. Long. about 22 mil., lat. 8. Table Cape."—R. M. Johnston.

This species is only known by the unique specimen and now, unfortunately, much reduced in size by fracture, which I have figured. However, from what is left of it, and from the description drawn up before mutilation, it is clear that it is an *Epidromus* and specifically distinct from its congeners in the Australian Tertiary beds. The large hemispheric apex with its depressed tip is comparable only with that of *E. texturatus*, whilst its rounded whorls and simpler ornament distinguish it.

4. *Epidromus citharellus*, *spec. nov.* Plate iv., fig. 6.

Shell turriculate; whorls six (apex unknown), nearly flat, ornamented with thin, elevated, slightly curved, transverse costæ (16 on the last whorl), the much wider concave interspaces distantly spirally striated; varices eight, irregularly disposed; outer lip lirate within.

Length, 18; breadth, 5.5; length of aperture and canal, 7.5.

Locality.—Lower beds at Muddy Creek (*J. Dennant*!)

5. *Epidromus leptoskeles*, *spec. nov.* Plate iv., fig. 10.

Shell with a narrow lanceolate outline of eight whorls; surface ornamented with slightly curved numerous transverse flat ribs. The wider interspaces are divided into oblong depression by regular, thick spiral lines. In other respects the species is like *E. tenuicostatus*.

Length, 14; breadth, 14.

Locality.—Lower beds at Muddy Creek (*J. Dennant*!)

6. *Epidromus texturatus*, *spec. nov.* Plate vi., fig. 10.

Shell ovately-turreted; whorls nine and a half of regular increase, terminating in a large hemispheric apex of two and a half rapidly decreasing whorls, the tip hardly depressed. The first whorl is smooth, the next is ornamented with flexuous radial ribs; the rest of the whorls rounded, but flattened behind, ornamented with revolving threads and curved costulations, spinosely granulated at the intersections; the intercostal spaces closely rugosely striated in the axial direction, and spirally by rounded threads with linear interstices. There are six liræ on the penultimate whorl, none on the posterior slope, which diminish in strength towards the anterior suture; and 40 to 50 costulations on the penultimate whorl, reduced to 30 on the body whorl.

Varices nine, broad, somewhat depressed.

Outer lip shortly lirate within; inner lip narrow, smooth.

Length, 37; breadth, 14; length of aperture and canal, 17.

Localities.—Blue clays, Schnapper Point; lower beds at Muddy Creek (*J. Dennant*!).

The specimen from the latter locality has thicker spiral ribs and larger tubercles, especially those of the posterior rib, which imparts a more quadrate outline; the costulations on the last whorl are fewer.

7. *Epidromus turritus*, *spec. nov.* Plate iv., fig. 4.

Shell turriculate, whorls eight, terminating in a blunt apex of two smooth subcylindrical whorls much smaller than the regular whorls; the third and fourth whorls bicarinate, the rest of the spire whorls angulated and shouldered, and much contracted towards the anterior suture; body whorl regularly and moderately convex, proportionately narrower than penultimate whorl, gradually attenuated into a broad, short, reverted beak. Ornamented with narrow, flat, spiral threads (five on the posterior slope of the penultimate whorl, 18 on the anterior portion, two of which, one on the keel, and one nearly medial, are stouter than the rest), crossed by costulæ (about 30 on the penultimate whorl), which are spinulose-granulated at the intersections; intercostal spaces closely, finely, transversely striated.

Varices three, confined to the anterior whorls, inconspicuous, having the form of lamellate imbrications.

Outer lip with numerous, short, slender ridges within; inner lip narrowly reflected, smooth.

Length, 27.5; breadth, 9; length of aperture and canal, 13.

Localities.—Lower beds at Muddy Creek (*J. Dennant*! and *J. B. Wilson*!); blue clays at Schnapper Point (*R. T.*).

FAMILY FUSIDÆ.

GENUS FUSUS.

SYNOPSIS OF SPECIES.

- I. Periphery carinated,* bearing hollow spines or foliations.
 Keel with foliar extensions. 1. *F. foliaceus*.
 Keel with spinous extensions.

(a). No spines in front of keel.

Posterior slope of whorl lirate.

Basal liræ spinous; posterior slope concave.

2. *F. acanthostephes*.

Basal liræ without spines; posterior slope convex.

3. *F. craspedotus*.

Posterior slope without liræ.

Basal liræ without spines.

4. *F. spiniferus*.

(b). Two rows of spines in front of keel.

One row of spines behind keel.

5. *F. cochleatus*.

Two rows of spines behind keel.

6. *F. senticosus*.*

The species of this group are obviously congeneric with *F. pagoda*, Lesson, which Professor v. Martens has recently attached to a new sub-genus of *Pleurotoma*, named *Columbarium*, on account of peculiarities of the radula; but on conchological grounds it will be convenient to include them under *Fusus*.

- II. Periphery (of last whorl at least) angulated or shouldered; whorls ribbed or tuberculated.

Whorls tabulated, crenate-dentate on the keel.

7. *F. dictyotis*.

Whorls equally sloping from the angulation.

Liræ on penultimate whorl.

Ten, stout, equal.

8. *F. Johnstoni*.

Twenty, slender, unequal.

9. *F. simulans*.

Seven, slender, subequal.

10. *F. sculptilis*.

Whorls angulated over anterior suture.

Periphery with keel-like ridges.

7. *F. dictyotis*, var.

Periphery with blunt nodulations.

11. *F. incompositus*.

Periphery with cuneiform, acute, tubercles.

* In most examples of *F. senticosus*, the whorls are quadrately rounded and only feebly carinated.

Apex large hemispheric; spire sub-cylindric.

12. *F. tholoides*.

Apex smaller; spire conic, ventricose.

13. *F. Aldingensis*.

III. Periphery neither angulated nor shouldered.

Shell lanceolate-fusiform.

Whorls flat, spirally lirate; no costæ.

14. *F. aciformis*.

Whorls flat, costated, spirally sulcated.

15. *F. hexagonalis*.

Whorls rounded, costated, with distant slender liræ.

10. *F. sculptilis*.

Shell elongate-fusiform.

Whorls rounded or flatly convex and subimbricating, without costæ; apex bulbous.

16. *F. bulbodes*.

Whorls rounded, posterior whorls plicate.

Liræ slender and granular; canal long and slender.

17. *F. Meredithæ*.

Liræ prominent angular, whorls very convex, spire attenuated.

18. *F. Gippslandicus*.

Liræ thick, few; canal short and stout.

19. *F. dumetosus*.

Whorls squarely rounded, covered with rows of tubular spines.

6. *F. senticosus*.

Shell ovately fusiform.

Whorls rounded, posterior whorls plicate.

20. *F. Tateanus*.

SPECIES EXCLUDED.

F. funiculatus, T. Woods, is transferred to *Columbella*.

F. Ino., T. Woods, is transferred to *Dennantia*.

F. Roblini, T. Woods, is transferred to *Siphonalia*.

F. styliiformis, T. Woods, is transferred to *Sipho*.

F. transenna, T. Woods, is transferred to *Peristernia*.

F. vitreoides, R. M. Johnston, in Proc. Roy. Soc., Tasm., for 1879, p. 32, from Table Cape, is uniquely represented by a rolled imperfect shell offering no distinctive characters, and had better be expunged; the generic position is very doubtful.

1. *Fusus foliaceus*, *spec. nov.* Plate vii., fig. 10.

Shell rather thin, with a high gradated spire ending in a small blunt mamillate apex of one and a half smooth whorls. Whorls eight and a half, the third whorl angulated in the middle and plicate; the rest of the whorls excessively angulated, the keel extended into a compressed upturned flange. The flange consists of two laminae, separated and supported by vertical transverse plates. The posterior slope of the whorls within the

flange is flat or slightly convex, ornamented with close fine sinuous growth-lines and by inconspicuous spiral threads; the coronal flange is obliquely wrinkle-ridged on both sides, raised into depressed scales on the outer side, particularly on the anterior whorls. Last whorl contracted very much from the middle of the base, which is defined by a strong thread coincident with the posterior angle of the aperture, and prolonged into a very long and very narrow slightly flexuous beak; base lirate (about ten), with alternating slender threads crossed by close imbricating lamellæ of growth; the beak is ornamented with oblique raised threads alternately large and small, wrinkled across by scaly lamellæ.

Aperture angularly rounded; outer lip thin, running out into a narrow canal at the keel, in front of which the margin is serrated, and lirate within; inner lip continuous, with outer lip at the top, somewhat thickened to the pillar beyond which it is continued as a sharp thin lamina.

Dimensions of a moderate-sized specimen:—Length, 44; breadth in front of flange, 11; length of aperture, 8; of canal, 25. Dimensions of figured specimen, of which the canal is incomplete:—Length, 44; breadth, 16; aperture height, 11.5; breadth, 9; length of canal, 19.

Localities.—Lower beds at Muddy Creek and blue clays at Schnapper Point.

This beautiful fossil is so much like the Challenger species, *F. pagodoides*, Watson, taken at a depth of 410 fathoms off Sydney, that it might easily be mistaken for it. The very ample description and figure of that species, however, permit to point out differential and distinctive characters: the fossil has a much smaller apex, is densely lirate on the anterior and base of body whorl, the beak is not prickly, and the coronal fringe is largely developed on all the whorls except the three apical ones.

2. *Fusus acanthostephes*, *spec. nov.* Plate vii., fig. 7.

Shell fusiform, rather thin, with a turreted spire ending in a small sphaeroidal apex, the next whorl very narrow and angulated; the rest of the whorls (six) excessively angulated and coronated at the keel with large erect or radially extended, compressed, hollow spikes. Last and penultimate whorls with three rounded serrated ridges on the posterior slope, reduced to one on the middle whorls and entirely absent on the earlier ones. Base of last whorl very contracted and precipitous, ornamented with four or five angular keels, the third from the coronal fringe serrated, the others carrying short, crowded recurved prickles. Beak encircled with prickly ridges. Margin of outer lip serrate-dentate, grooved within.

Length, 55; breadth, 20; aperture, height, 9.5; breadth, 7.5; length of canal, 30.

Localities.—Blue clays at Schnapper Point, and lower beds at Muddy Creek.

Another remarkable species of the same type as *F. foliaceus*, but the coronal fringe is cut up into spines, as in the recent *F. pagoda*, Lesson, from which it differs by its shorter spire and narrower whorls, serrated liræ on the posterior slope of the whorls, and in the shape of the last whorl, which is prickly spirally ridged on the base.

3. *Fusus craspedotus*, *spec. nov.* Plate vii., fig. 4.

Shell thin, fusiform, with a high spire, ending in a small mamillate apex of two smooth whorls; whorls eight and a half in all, excepting apical ones, very angular, and compressed into a narrow keel, crenate-dentate on the margin. Last whorl with the posterior slope convex, depressed behind the keel, and much more so at the suture; the rounded and contracted base is produced into a long, rather broad, somewhat flexuous beak; ornamented on the posterior slope with numerous inconspicuous spiral threads, and towards the middle by two or three prominent ones, crossed by growth lines which are raised into minute scales on the larger liræ; bases of serrations with rounded ridges conformable with their curvature. Base of body whorl encircled by a slender keel, which is coincident with the posterior angle of the aperture; the whole surface roughly cancellated by numerous unequal spiral threads and lamellæ of growth; beak encircled with spiral threads and two or three ridges carrying vaulted scales.

Aperture angularly rounded; outer lip thin, its margin crenulated, sulcated within, running back in a short canal at the keel, and somewhat insinuated behind the keel.

Length (canal incomplete), 47; breadth, 20; aperture, height 15, breadth 8; length of canal (incomplete), 14.

Localities.—Blue clays at Schnapper Point; and lower beds at Muddy Creek; Table Cape (*R. M. Johnston*!).

This belongs to the same group as *F. foliaceus*, and, like all cohabitant species, the interior is grooved coincident with the keel; its shape and ornament distinguish it.

4. *Fusus spiniferus*, *spec. nov.* Plate vii., fig. 1.

Shell somewhat thin, of seven whorls, similar to *F. acanthostephes*, with a shorter spire; the summit is a little variable in shape, but is never spherical; the posterior slope of the whorls without any spiral ornament; the base of the last whorl with a crenated slender keel coincident with the posterior angle of the aperture, and usually with a similar one in front of, but

contiguous to it; anterior to which is a spiral thread or two. Outer lip dentate on the margin corresponding with the basal liræ.

Length, 32; breadth, 11; height of aperture, 8; length of canal, 18.

Locality.—"Gastropod-bed" of the River Murray Cliffs near Morgan.

5. *Fusus cochleatus*, *spec. nov.* Plate viii., fig. 9.

Shell elongately fusiform, whorls nine and a half, apex obtuse of one and a half rounded whorls; the rest of the whorls bisected by a thin, compressed, elevated keel, extended into flat, vaulted, pointed scales; the first three spire whorls ornamented only with close sinuous growth lines, the others with a strong ridge on the posterior slope contiguous to the keel, and two similar, equi-distant ones in front, all provided with scales like those on the keel, though smaller. Canal encircled with rows of vaulted scales.

Length, 34; breadth, 12; length of canal and aperture, 18.

Locality.—Turritella clays, Blanche Point, Aldinga Bay.

6. *Fusus senticosus*, *spec. nov.* Plate vii., fig. 3.

Shell thin, elongately fusiform, slender; whorls six and a half, apex obtuse of one and a half more or less elongate smooth whorls; the other whorls squarely rounded, deeply impressed at the suture, with five encircling ribs covered with tubular hollow spines, or slender vaulted pointed scales; the middle rib on the angle of the whorl stouter than the rest, and furnished with long spines. Last whorl shouldered and subtabulated, with two or three threads rarely wanting on the posterior slope; the rounded base and canal with equi-distant similar spiral liræ, one or two on the canal are stouter and provided with larger spines.

The transverse ornament is very peculiar, consisting of imbricating lamellæ, more or less radially disposed around the bases of the spines, and the bundles of one row somewhat alternating with those of the next.

Length, 20; breadth, 5.5; height of aperture, 4; length of canal, 10.

Localities.—Blue clays at Schnapper Point; lower beds at Muddy Creek; gastropod-bed, River Murray Cliffs, near Morgan.

7. *Fusus dictyotis*, *spec. nov.* Plate vii., figs. 2 and 6.

Shell stout, elongately fusiform with a high gradated spire, angulated whorls, serrately-dentate on the keel, finely spirally lirate and crossed by thin lamellæ. Whorls, nine, in-

cluding the mamillate apex of two subglobose whorls; earlier ones bicarinated, stoutly costated, and latticed by spiral liræ, and frilled lamellæ of growth. Anterior whorls bisected by a strong keel raised into wide cuneate compressed serrations, almost tabulated above, conically contracted in front with a strong spiral thread in the middle line; there are about nine unequal liræ on the posterior slope of the penultimate whorl, and an equal number in front of the keel. Last whorl a little ventricose in the middle line, rounded at the base, and contracted into a long, nearly straight, open canal; there are eight rounded plications on the whorl, vanishing on the base; anterior portion of whorl with raised angular encircling liræ, with alternating slender and stouter threads in the interspaces; whole surface crossed by thin continuous lamellæ, which project into vaulted scales on the encircling keels and liræ; canal ornamented as the base, but the vaulted scales on the stouter ridges projecting into small sharp points.

Aperture angularly rounded; outer lip thin, lirate within, continuous with the inner lip which is continued as a sharp, thin, elevated lamina to the extremity of the canal.

Length, 82; breadth, 24; aperture, height, 16; width, 11; length of canal, 35.

Localities.—Blue clays at Schnapper Point; lower beds at Muddy Creek; gastropod-bed of the River Murray Cliffs, near Morgan; and in a well sinking 24 miles north of Morgan.

VAR., Pl. vii., fig. 6, with a longer straight declining shoulder; plications rounded, not produced into sharp points, the angulation which is less prominent. The figured specimen is an extreme form, but it is connected with the type by graduating specimens.

Localities.—Lower beds at Muddy Creek; River Murray Cliffs; Table Cape (*R. M. Johnston!*)

8. *Fusus Johnstoni*, T. Woods. Plate xii., figs. 4a, 4b.

F. Johnstoni, T. Woods, Proc. Roy. Soc., Tasmania, for 1876, p. 94.

Shell narrowly fusiform, terminating in an obtuse apex of two smooth subglobose whorls; whorls eight (excepting the nuclear ones), convex, angular, spirally lirate, and transversely plicate. The liræ are stout convex equal and equidistant, sometimes with a thread in the interstices, about 10 on the penultimate whorl. Costæ broad, rounded, about eight to 10 on each of the anterior whorls, but diminish in number up the spire, and scarcely appear in front of the periphery on the last whorl.

Length, 21; breadth, 9; length of canal and aperture, 16.

Locality.—Table Cape. (*R. M. Johnston!*)

This species differs from *F. Meredithæ* by its less acuminate spire, more angular and regularly plicate whorls; the whorls are more regularly increasing than in *F. simulans*, and the liræ are very much stouter and fewer.

9. *Fusus simulans*, *spec. nov.* Plate x., figs. 2a, 2b.

Shell closely approximating to *F. Meredithæ*; whorls eight, all, excepting the two large apical ones, angulated or angularly convex, slenderly costated, and tuberculated on the keel; costæ, seven to nine on the last whorl; liræ not all granulated, about 20 on penultimate whorl alternately large and small.

The angular stoutly tuberculated whorls are characters too pronounced to permit of specific identity with *F. Meredithæ*; the apex though small is about twice the size of the Tasmanian fossil.

Length, 31; breadth, 12·5; length of aperture and canal, 7.

Localities.—Gastropod-bed of the River Murray cliffs, near Morgan; lower beds at Muddy Creek.

10. *Fusus sculptilis*, *spec. nov.* Plate x., fig. 13.

Shell lanceolar-fusiform, thin, of seven and a half whorls. Apex blunt, of one and a half rounded smooth whorls, becoming angulated and graduating into the next whorl, which is medially angulated and transversely costated; the rest of the whorls convex, of slow increase, separated by a deep impressed suture, ornamented with costæ and curved transverse threadlets, and strong encircling threads.

The costæ are rounded, moderately elevated, and number about ten on the body whorl. The liræ are flat, thin, more or less minutely crenulated, and raised into small acute nodulations as they pass over the costæ; on the penultimate whorl there are about six principal liræ, the one at the periphery stronger than the rest, with one slender thread here and there in between.

Last whorl abruptly attenuated into a long, narrow, straight canal; the costæ faintly extending on to the canal, which is spirally lirate. Aperture oval, peristome continuous, inner lip faintly lirate within.

Length, 14; breadth, 4; length of aperture and canal, 8.

Locality.—Clayey green-sands, Adelaide bore.

11. *Fusus incompositus*, *spec. nov.* Plate iii., fig. 9.²

Shell elongate-fusiform, with the spire suddenly contracted in front of the large subcylindrical apex, which consists of two smooth ventricose whorls, with the extreme tip somewhat obliquely flattened down. The next whorl is very narrow, sub-angulated medially, and spirally striated; the three other

whorls are roundly angled a little in front of the medial line, with a row of large, rounded, nodular plications on the anterior slope, ornamented with raised, angular, spiral threads (12 to 15 on the penultimate whorl, of which the posterior are finer than the anterior ones), crossed by flexuous striæ. The nodulations on the last whorl are six, large, faintly traceable to the suture as oblique undulations, and vanishing anteriorly at the base, which is contracted into a long, slightly flexuous, lirate and transversely striated beak.

Length, 27; breadth, 9; length of aperture and canal, 16.

Localities.—Clayey green sands, Adelaide bore; and "Turritella clays," Blanche Point, Aldinga Bay.

12. *Fusus tholoides*, *spec. nov.* Plate iii., fig. 11.

Shell fusiform, with a short spire ending in a very blunt hemispheric apex. Whorls five, the first smooth, depressed; the second high, flatly convex, radially ribbed and spirally lirate; the third slightly angular medially with similar but stronger ornament; the anterior whorls angularly convex, slightly angled, and crenately serrate at the shoulder; faintly transversely costated (about 10 to a whorl), and irregularly cancellated by spiral liræ and transverse threads. There are about 10 liræ on the posterior slope of the penultimate, and six alternately stout and slender on the front.

The last whorl is obscurely flatly rounded in the middle where the costæ fade away, thence abruptly contracted in a long, straight, open beak; base with numerous granularly wrinkled liræ; the interspaces closely cancellated.

Length, 22; breadth, 9; length of canal and aperture, 15.

Locality.—Clayey-green sands, Adelaide bore.

13. *Fusus Aldingensis*, *spec. nov.* Plate iii., fig. 10.

The young shell resembles *F. tholoides*, but has a broader spire, smaller blunt apex, the whorls subimbricating with a suprasutural angulation crowned with stronger serrations.

Length, 22; breadth, 9.5; length of canal and aperture, 16.

Adult specimens of seven whorls have the anterior whorls sharply keeled in the anterior third, obliquely plicated, the plicæ (10 to a whorl) forming wedge-shaped tubercles on the keel; the whole surface is finely cancellated by slender spiral threads and transverse striæ. At this stage the species simulates *Fasciolaria cristata* (see p. 151), but apart from other differences the incisions on the keel are very much shallower and the projections very much smaller and pointed.

Length, 35; breadth, 14.5; length of aperture and canal, 20.

Locality.—Turritella-clays, Blanche Point, Aldinga Bay.

14. *Fusus aciformis*, *spec. nov.* Plate vii, figs. 5a—5b.

Shell lanceolate-fusiform, with a regular decreasing spire of flatly convex whorls, terminating in an obtuse summit of two and a half whorls; the anterior whorl of the apex is tumid in the middle, radially ridged, and is wider than the succeeding spire-whorl; the next apical whorl is much narrowed, and the small tip is depressed. Whorls $10\frac{1}{2}$, excepting the apical ones, almost flat; suture linear, somewhat concealed; the earlier whorls with five equal equidistant subacute elevated liræ, the broad concave interspaces traversed with close-set growth-wrinkles; the liræ increase in number with the growth of the shell and are about ten on the penultimate whorl.

Last whorl of very slight increase, gradually tapering into the long straight beak, ornamented with wavy, acute, encircling ridges. Outer lip thin, lirate within; peristome continuous, inner lip not reflected.

Length, 41; breadth, 7; length of canal and aperture, 22.

Localities.—Blue clays at Schnapper Point; and lower beds at Muddy Creek.

In its very narrow lanceolate form this fossil most resembles *F. acus*, Adams and Reeve; but the whorls are flatter, and without axial ribs.

15. *Fusus hexagonalis*, *spec. nov.* Plate iii., figs. 15a—15b.

Shell linear-lanceolar-fusiform, prismatic. Apex of two and a half whorls, medially angulated; the anterior one costated and projecting beyond the succeeding whorl, the next narrower, smooth, and ending in an upturned lateral point. The rest of the whorls six and a half, the earlier ones angulated medially, gradually becoming flatly convex, separated by a deep suture; with slender axial plications or angulations, usually six on a whorl in an alignment one with another from whorl to whorl, thereby imparting an hexagonal outline to the spire; ornamented with flat encircling ridges and grooves, the relative width of the ridges and furrows being different for different individuals, and traversed by growth lines, which are raised into arched scales at the suture.

Last whorl of slight increase, convex or flatly rounded at the periphery, costæ reaching to the base, but not on to the beak; ornamented as the spire; rather abruptly contracted into a long, slender, straight beak. Aperture narrow, oval-oblong; outer lip lirate within, its margin crenulated.

Length, 19; breadth, 3; length of aperture and canal, 11.5.

Locality.—Lower beds at Muddy Creek.

16. *Fusus bulbodes*, *spec. nov.* Plate vii., fig. 8.

Shell long, fusiform, with a rapidly narrowing spire of sub-imbricating whorls, terminating in a large ovoid summit.

Whorls eight, the first somewhat globose, the next very narrow, smooth, and bicarinated, the third nearly flat, shining, and spirally scratched; the other whorls gradually becoming more and more obtusely angled and swollen round the anterior part, being very contracted at the anterior suture, and flatly sloping to the posterior suture; encircled with raised threads (about 15 on the penultimate whorl) narrower than the interspaces, which are traversed by close-set striæ.

Last whorl tumid and rounded at the periphery, rapidly contracted at the base into a long, narrow, straight canal; the surface tessellated by transverse threads and stouter spiral liræ.

Dimensions of young perfect specimen of five whorls.—Length, 44; breadth, 10·5; length of canal and aperture, 27·5; diameter of bulbous summit, 4·5. Of a large incomplete specimen.—Length, 68 (85 estimated); breadth, 22·5; length of canal and aperture, 33 (estimated 50).

Localities.—Blue clays at Schnapper Point; and lower beds at Muddy Creek.

17. *Fusus Meredithæ*, T. Woods.

F. gracillimus, Tenison Woods, Proc. Roy. Soc., Tasm., for 1875, p. 22 (non Adams and Reeve).

F. Meredithæ, Tenison Woods, op. cit. on legend to pl. i, fig. 6.

Shell elongate-fusiform, with a high conical acuminate spire, ending in a very slender apex of one and a half smooth high whorls. Whorls below the apex, seven and a half, convex, the body whorl sometimes subangulated and somewhat tumid, spirally sulcated, and slenderly ribbed and transversely costated.

There are about 10 slender costæ on each of the posterior whorls, becoming more and more reduced in size, usually absent on one or more of the median whorls, and on the body whorl are represented by short corrugations at the periphery. The spiral threads are flatly rounded, alternating with a little wider flat grooves often with a fine thread in the middle; crossed by distant striæ which obscurely granulate the liræ. There are about 12 liræ on the penultimate whorl.

Aperture ovate, rather abruptly contracted to the long, rather open canal; outer lip thin, obscurely crenulated on the margin, lirate within.

Length, 33; breadth, 11; length of aperture, 8; of canal, 10.

Locality.—Table Cape. (*Hobart Mus. ! R. M. Johnston !*)

18. *Fusus Gippslandicus*, spec. nov.

Shell elongate-fusiform, ending in a smallish mamillate apex of one and a half smooth-rounded whorl, the tips

laterally immersed; whorls below the apex seven, of very slow increase, convex, much contracted at both sutures, stoutly but narrowly ribbed, lirate. Transverse plications about 11 to a whorl, narrow, very prominent, slightly nodulose, almost obsolete on the body whorl. Spiral ridges angular, four of which on the middle and front very prominent, with an intermediate thread. Three slender liræ on the posterior slope; whole surface transversely closely wrinkled. Base gradually attenuated, ornamented with alternately large and small angular encircling ridges.

Length, 44; breadth, 13; length of aperture, 12, of canal, 12.

Localities.—Jemmy's Point and Cunninghame, Gippsland. (*W. H. Gregson*!)

This is a more slender shell with narrower costæ than *F. dumetosus*; it differs from *F. Meredithæ* by its coarser ornament, more convex whorls, and less ventricose body whorl.

19. *Fusus dumetosus*, *spec. nov.* Plate ix., fig. 1.

Shell stoutly fusiform, whorls rounded and spirally ridged; differing from *F. ustulatus*, Reeve, by the whorls being of less rapid increase, last whorl not so ventricose, and by the absence of axial plications on the anterior whorls, at least, on the body whorl.

Length, without apex, 31.5; breadth, 12.5; length of aperture and canal, 18.

Locality.—Upper beds at Muddy Creek (*J. Dennant*!)

20. *Fusus Tateanus*, *T. Woods*. Plate xiii., fig. 5.

F. Tateana, Tenison Woods, Proc. Roy. Soc., Tasmania, for 1876, p. 94.

Shell ovately fusiform; whorls seven (without apex), the body and penultimate whorls roundly convex, obscurely distantly spirally lirate and transversely striated; the rest of the spire whorls flatly convex, the posterior ones costated and lirated. There are about ten costæ in a whorl, and about 15 subangular threads equi-distant and about equal to the intervening sulci. Last whorl rather sloping to the suture; aperture elliptic, outer lip thin and abruptly incurved to the long, narrow canal.

Length of an incomplete specimen, 86; breadth, 35; length of aperture, 30; of canal, so much as known, 25.

Locality.—Table Cape, Tasmania (*Hobart Mus.*! *R. M. Johnston*!)

This fossil is very distinct from any living species, but is remotely related to *F. longævus* of the European Eocene.

GENUS SIPHONALIA.

SYNOPSIS OF SPECIES.

Whorls angulated, subimbricating.

Spire elevated; crenate-dentate on the keel; spirally lirate. 1. *S. subreflexa*.

Spire short; nodulate on the keel; transversely lamellate. 2. *S. lamellifera*.

Whorls shouldered.

Shell elongate-fusiform and costated.

Liræ, 15; tubercles, 13. 3. *S. Roblini*

Liræ, 11; tubercles, 11, and stouter. 4. *S. longirostris*.

Shell pyriform, costated anteriorly. 5. *S. spatiosa*.

1. *Siphonalia subreflexa*, G. B. Sowerby.

Fusus subreflexus, G. B. Sowerby, in Darwin's Geological Observations, 1844, 2nd ed., p. 616, t. 4, fig. 57.

Shell fusiformly turreted; apex small mamillate of two smoothwhorls; the next four whorls convex, transversely costated, and spirally lirate; the four anterior whorls angulated and ventricose in front of the middle, the posterior slope convex, tuberculated on the keel, spirally lirate with alternately stout and slender threads, and cancellated by transverse striae. The tubercles are compressed, prominent, and about 13 to a whorl. Aperture large, oval; outer lip lirate within; canal long, curved to the left.

Length, 85; breadth, 40; length of aperture, 32; width of aperture, 19; length of canal (incomplete), 20.

Locality.—Lower beds at Muddy Creek (*J. Dennant*!)

This species is markedly distinct from the two next species by its prominent submedial tuberculated keel, without any trace of costation, except on the posterior whorls. It is with some reluctance that I ascribe our fossil to Sowerby's *F. subreflexus*, from the Chilian Tertiary, as it is possible that differences of ornament or other minute characters may really exist which are not pictorially or verbally indicated.

2. *Siphonalia lamellifera*, *spec. nov.* Plate viii., fig. 5.

Shell ovately fusiform, stout, with a low conic spire of subimbricating flat whorls ending in an obtuse apex. Whorls six, angulate over the suture; last and penultimate whorls bluntly nodulose on the keel (eight to a whorl). Last whorl bisected by a blunt keel, the medial portion roundly truncated, ornamented with stout plications, which terminate at the keel in stout, blunt nodulations; anteriorly abruptly contracted into the concave base, which is prolonged into a broad, curved, upturned, longish canal. Surface ornamented with imbricating

lamellæ insinuated at the keel; at the keel, and in front of it, the lamellæ are raised into slender close frills, which about the keel are more or less continuous, and appear as raised threads. Aperture trapezoidal; outer lip smooth within for a distance of about six mills., beyond which the surface is closely and regularly spirally striated, and provided with narrow and short callous ridges.

Length, 52; breadth, 29; length of aperture and canal, 36.

Locality.—Blue clays at Schnapper Point, Port Phillip.

3. *Siphonalia Roblini*, T. Woods.

Fusus Roblini, Tenison-Woods, Proc. Roy. Soc., Tasman., for 1876, p. 22, tab. 1, fig. 7.

Anterior whorls subangulated, with 13 subdistant, somewhat sharp tubercles on the angulation,* ornamented with spiral acute threads, alternately large and small—about 15 large ones on the penultimate whorl—cancellated by thickish subdistant transverse striæ. The posterior whorls are transversely plicate, the plicæ gradually reduced to tubercles. Aperture elongately pyriform; outer lip thin, costated within; canal elongate, twisted, and recurved.

The type specimen possesses five and a half whorls, the apex being broken off, and has a length of 66, breadth of 30, length of aperture and canal of 41, and breadth of aperture of 14.

Locality.—Table Cape (*Hobart Mus.*!).

4. *Siphonalia longirostris*, spec. nov. Pl. xi., fig. 8.

Shell elongate-fusiform, with a high subscalar spire, ending in a small mamillate apex of one and a half smooth convex whorls. Whorls nine, convex to subangulated; ornamented with transverse costæ, which are reduced to somewhat sharp tubercles, and subacute spiral threads alternately large and small, crossed by subdistant lamellæ. There are 11 tubercles on the body whorl and about 11 strong spiral threads on the penultimate whorl.

Aperture elongately pyriform; outer lip thin, internally sulcated; canal elongate and much twisted.

Length, 69; breadth, 27; length of aperture and canal, 40; breadth of aperture, 11.

Localities.—Blue clays at Schnapper Point and lower beds at Muddy Creek.

This species differs from *S. Roblini* by its more convex whorls, more elevated and stouter costæ, and by the fewer and stouter spiral threads.

5. *Siphonalia spatiosa*, spec. nov. Plate iv., fig. 5.

Shell somewhat elongately pyriform; whorls six; apex want-

* The figure represents the tubercles much too large.

ing; posterior whorls flat or slightly convex, with a row of nodulations at the anterior suture; anterior whorls tabulate, the posterior slope very wide, upward inclined, the anterior slope narrow and contracted at the suture, roundly plicated, the plicæ terminating at the keel in obtuse nodulations. Last whorl ventricose in the middle, slightly sloping from the keel for a distance equal to the length of the posterior slope, thence suddenly contracted in a long, rather wide, curved, and slightly reverted canal; the transverse plications do not extend on to the base, and are absent in the anterior-fourth of the whorl; there are 14 nodulations on the last whorl.

The whole surface is ornamented with crowded depressed rounded spiral threads, alternately large and small, crossed by curved lines and striæ of growth which obscurely crenulate the liræ.

Aperture large, oval; outer lip slightly dilated anteriorly, and slightly ascending posteriorly, smooth within; inner lip widely spreading over the columella and decurrent on the inner face of the canal; columella slightly concave above the pillar.

Length, 98; breadth, 48; length of aperture and canal, 73.

Locality.—Upper beds at Muddy Creek. (*J. Derrant!*)

GENUS SIPHO.

SYNOPSIS OF SPECIES.

Aperture variced; without costæ. 1. *S. labrosus*.

Aperture simple.

Ornament of granular rows; no costæ.

2. *S. crebrigranulosus*.

Ornament of flat equal threads; costated.

3. *S. styliiformis*.

Ornament of round threads, alternately large and small and transverse lamellæ, with or without costæ.

4. *S. asperulus*.

1. *Sipho labrosus*, *spec. nov.* Plate iii., fig. 7.

Shell linear-lanceolar-fusiform, thin, of five and a half whorls, ending in a large blunt mamillary apex of one and a half globose smooth whorls. The other whorls convex, separated by a deep suture, ornamented all over with encircling liræ (ten on the penultimate whorl) alternately stout and slender, crossed by angular threads raised into subgranular imbrications on the liræ.

Last whorl gradually attenuated into the long, slightly curved and reverted, open canal; the outer lip is thickened by a varix slightly removed from the edge, varix somewhat angular and insinuated at the suture.

Aperture narrow-oval, peristome entire and smooth.
Length, 11; breadth, 3·5; length of aperture and canal, 6.
Locality.—Lower beds at Muddy Creek.

2. *Sipho crebrigranosis*, *spec. nov.* Plate iii., fig. 8.

Shell broadly lanceolar-fusiform, rather stout, of six and a half whorls, ending in a large blunt mamillary apex of two globose smooth whorls; the rest of the whorls moderately convex, separated by a linear suture; ornamented all over with equal and equi-distant encircling liræ and transverse threads, almost obliterated by the development of granules at the intercrossing (the liræ are about 12 on the penultimate whorl). Last whorl tapering into a moderately long, slightly curved, hardly reverted, open canal; inner lip lirate within.

Length, 13; breadth, 4; length of aperture and canal, 8.
Locality.—Lower beds at Muddy Creek.

3. *Sipho styliiformis*, *T. Woods*.

Fusus styliiformis, Tenison-Woods, Proc. Lin. Soc., N.S.W., vol. iv., p. 12, tab. 3, fig. 6, 1879.

Shell elongately fusiform, slender, thin; whorls seven. Apex of two smooth whorls, joined to the spire by a thick varix, behind which, for about half a whorl, the surface is costated, thence rapidly enlarging into a globose whorl terminating in a narrow subimmersed tip. The spire whorls slightly convex, a little contracted at the anterior suture, rendered almost prismatic by regular disposed rounded plications (seven to a whorl); suture impressed, more or less concealed by vaulted imbricating scales; ornamented with flat spiral liræ about or nearly equalling the flat, smooth, intervening furrows (about seven on the penultimate whorl).

Body whorl rather abruptly contracted into a long, wide, slightly twisted and reverted canal; aperture ovate; outer lip thin; lirate within; columella arched, smooth.

Length, 12·5; breadth, 4·5; length of canal and aperture, 7.

Localities.—Lower beds at Muddy Creek; "gastropod bed" of the River Murray Cliffs, near Morgan.

4. *Sipho asperulus*, *spec. nov.* Plate vi., fig. 5.

Shell similar to *S. styliiformis*, but larger, with flat whorls channelled at the suture, and the ornament consisting of spiral, narrow, rounded threads alternately large and small (about ten on the penultimate whorl), crossed by lamellæ, which are raised into low scales over the liræ. The plications are not so strongly developed as in the allied species, and are more usually obsolete or reduced to axial angularities.

Length, 19; breadth, 7; length of aperture 5, and of canal 5; width of aperture, 3.

Locality.—Lower beds at Muddy Creek.

GENUS PSEUDOVARICIA.

Name in allusion to the abnormal character of the varices.

Type.—*P. mirabilis, spec. nov.*

Generic characters.—Shell cylindroid-fusiform, smooth, spire obtuse, whorls with a few remote and non-continuous imbricating varices; canal very short, wide; columella smooth, slightly arched.

The varices are not produced as ordinarily by an outward thickening or bulging of the shell wall, but appear as abrupt step-like interruptions to the regularity of the spiral curve, and seem to indicate that each periodic mouth was slightly margined with enamel, and the new growth to have been commenced from within, so that the successive growths are not in the same plane.

The peculiarity of its variceal characters and the blunt apex remove this genus from *Genea*, Bellardi, of the Italian Tertiary, which in other particulars it resembles. Tryon, in his Manual of Conchology, places *Genea* in a subordinate position to *Fusus*, but I think it is more related to *Neptunea* or *Sipho*.

1. *Pseudovaricia mirabilis, spec. nov.* Pl. vii., figs. 9a—9c.

Shell elongately fusiform, smooth, shining, rather thin, with a cylindrical spire a little longer than the aperture, ending in a very blunt apex of two very rapidly narrowing whorls, flattened at the summit.

Whorls below the apex, six, very broad, of slow increase, flatly convex, with a very narrow high-sloping shoulder, defined by a strong thread; 11 varices, or about two to a whorl, irregularly disposed. Whole surface transversely, finely, and closely striated, except on the shoulder, where they are stouter and more distant. On each side of the angulation are two or three spiral threads, which on the posterior whorls are cut up into elongate granulations.

Aperture elliptical; outer lip plain, smooth within; columella slightly incurved, smooth; canal wide, short, nearly straight, obliquely emarginate.

Length, 46; breadth, 13; length of aperture and canal, 21; width of aperture, 6.

Locality.—Lower beds at Muddy Creek (*J. Dennant*!).

GENUS COMINELLA.

SYNOPSIS OF SPECIES.

Whorls convex, not shouldered.

Lirate, posteriorly faintly costated. 1. *C. crassina*.

Strongly lirate and linearly costated, punctatedly impressed. 2. *C. pertusa*.

Costated throughout. 3. *C. subfilicea*.

Plicately-wrinkled; base smooth. 4. *C. pumila*.

Whorls shouldered and, except body whorl, strongly costated. 5. *C. Clelandi*.

Species excluded.

C. cancellata, *T. Woods*, is transferred to *Bela* as *B. Woodsii*.

C. lyræcostata, *T. Woods*, is transferred to *Phos*.

1. *Cominella crassina*, *spec. nov.* Plate x., fig. 4.

Shell excessively strong with the form of the elate variety of *C. alveolata*, Kiener, described as *C. Adelaïdensis*, Crosse and Fischer; the ante-sutural impression is broad and well defined, the posterior whorls only are faintly costated; the differential characters are the wide, flat encircling furrows, as wide, or nearly as wide, as the ridges, marked with transverse, curved lines; the outer lip is strongly ridged within.

Length, 32; breadth, 16; length of aperture and canal, 19.5.

Locality.—Upper beds at Muddy Creek (*J. Dennant*!).

2. *Cominella* ? *pertusa*, *spec. nov.* Plate ix., fig. 11.

Shell minute, ovate-oblong; apex small, mamillate, of one and a half whorls with the tip obliquely immersed; the rest of the whorls four, convex, suture impressed, ornamented with straight, thread-like costæ, about 15 to a whorl, and thick spiral threads punctatedly impressed in the narrow interstices; spiral threads eight on the penultimate whorl.

Aperture round, large, emarginate in front; outer lip a little dilated, faintly tuberculated within, variced behind.

Length, 4.25; breadth, about 2.5; length of aperture, 2.

Locality.—Clayey green sands, Adelaide bore.

3. *Cominella subfilicea*, *spec. nov.* Plate x., fig. 6.

Shell with the form of *C. filicea*, Adams, and, like it, with costæ descending to the base of the last whorl, but it differs by its encircling depressed ridges separated by linear furrows, as in most species of the genus, whereas in the living shell the surface is finely striated and marked with colour lines.

Length, 20; breadth, 9; length of aperture and canal, 12.

Localities.—Oyster banks, Aldinga Cliffs; and equivalent beds at Hallett's Cove, St. Vincent Gulf.

4. *Cominella pumila*, *spec. nov.* Plate iv., fig. 12.

Shell very small, thin, ovate; whorls five, convex, apex mamillate; the whorl next the pullus smooth, the next two ornamented with narrow, close, wrinkle-like transverse ridges, which on the last whorl are confined to the posterior one-third, rest of the whorl inornate.

Length, 5; breadth, 3; length of aperture and canal, 3.5.

Locality.—Clayey green sands, Adelaide bore.

This little fossil has a general resemblance to *Cyllene plumbea*, but wants the distinctive characters proper to that genus.

5. *Cominella Clelandi*, *spec. nov.* Plate xi., fig. 1; plate xiii., fig. 1.

Shell of the shape and style of ornament of *Trophon Flindersi*, but with the aperture of *Cominella*; posterior whorls with about ten costæ, spirally liræ, last whorl convex, roundly shouldered, costæ obliterated.

Length, estimated, 35; breadth, 22; length of aperture, 24.

Locality.—Upper Aldinga series of beds at Hallett's Cove, collected by Dr. Cleland, Hon. Sec. of the Society, after whom the species is named.

GENUS BUCCINUM.

1. *Buccinum fragile*, *T. Woods*, Proc. Roy. Soc., Tasm., for 1876, p. 107, from Table Cape, is unknown to me.

GENUS FASCIOLARIA.

SYNOPSIS OF SPECIES.

Whorls rounded, costated

Ovately fusiform, costæ broad, liræ many.

1. *F. Tenisoni*.

Lanceolately fusiform, costæ broad, liræ few.

2. *F. exilis*.

Elongate-fusiform, costæ narrow, angular.

3. *F. concinna*.

Whorls angularly convex, nodulated on the angulation.

4. *F. decipiens*.

Whorls medially raised into a crenately incised keel.

5. *F. cristata*.

Whorls shouldered, costulated in front.

Elongate-fusiform, last whorl of moderate size, canal nearly straight.

6. *F. cryptoploca*.

Last whorl ventricose; canal twisted.

7. *F. rugata*.

1. *Fasciolaria Tenisoni*, *T. Woods*.

Fasciolaria Tenisoni, Tenison-Woods, Proc. Lin. Soc., N.S.W., vol. iv., p. 13, tab. 3, fig. 3, 1879.

Shell ovately fusiform, with a moderately high conic spire, ending in a blunt apex of one and a half subglobose whorls. Whorls six and a half, moderately convex, with broad rib-like folds (nine on the last whorl), wider than the intervening concave interspaces, evanescent towards the posterior suture; ornamented in a spiral direction by narrow, elevated, subacute threads (about 12 on penultimate whorls), sometimes with a thread let in the furrow, cancellated by regular nearly straight growth lines. Columella with one conspicuous plait at the top of the pillar, succeeded by two small ones; canal long, straight; outer lip thin, lirate within.

Length, 30; breadth, 11; length of aperture, 9; and canal, 11.

Locality.—Lower beds at Muddy Creek (*Tenison-Woods* and *J. Dennant*!).

2. *Fasciolaria exilis*, *spec. nov.* Plate x., fig. 3.

Shell lanceolate-fusiform with an elongate acuminate spire ending in a small blunt apex of two subglobose whorls; whorls nine, excepting the apical ones, flatly convex, transversely plicate, and widely latticed by transverse threadlets and distant encircling liræ. The costæ are about eight to a whorl; on the posterior whorls they are thick and rounded, about equalling the interspaces, becoming narrow more angular and wider apart as the whorls increase; there are six elevated moderately thick liræ on the penultimate whorl, usually with a threadlet in the wide intervening spaces. Last whorl of very slight increase, gradually tapering into the long, straight, narrow beak, which is encircled with flat ridges.

Outer lip crenulated on the margin, lirate within; columella with two or three small oblique plaits.

Length, 18; breadth, 4.5; length of aperture and canal, 9;

Localities.—Gastropod bed of the River Murray Cliffs, near Morgan; blue clays at Schnapper Point; lower beds at Muddy Creek.

3. *Fasciolaria concinna*, *spec. nov.* Pl. viii., fig. 6.

Shell elongate-fusiform, with a high acuminate spire, ending in a small mamillate apex of one and a half smooth whorls, with the tip immersed and somewhat lateral. Whorls eight and a half, the posterior spire whorls slightly gradated, plicate, encircled with strong liræ, crenulated by close-set transverse striæ; the anterior whorls convex, a little ventricose medially, but more contracted in front than behind; ornamented with narrow, regular, subacute plications, confined to the anterior half of each whorl (15 on the penultimate whorl), and rather stout, elevated, flat spiral ridges (15 on the penultimate whorl), the flat intervening spaces of double the width, provided with

from two to four spiral threadlets; the whole surface transversely striated; the striae crenulate the edge of the liræ and produce with the spiral threadlets a neat cancellation in the inter-spaces.

Last whorl a little tumid on the base, which contracts abruptly, and is suddenly prolonged into a narrow beak; surface ornamented as the rest of the shell. Aperture round, with a sharp angle at the top; outer lip sharp, thin, well arched, crenulated on the margin, faintly lirate within; inner lip slightly concave, with a thick oblique twist-like fold at the front; canal narrow, long, slender, and nearly straight.

Length, 40; breadth, 15; aperture, length 12, width 7; length of canal, 11.

Locality.—Blue clays at Schnapper Point.

4. *Fasciolaria decipiens*, *spec. nov.* Plate viii., fig. 1.

Shell elongately fusiform, with a high turritid spire ending in a small blunt mamillate apex of one and a half smooth rounded whorls, the tip immersed.

Whorls nine and a half, of regular increase; the *anterior* ones roundly angulated and nodulated medially, *concave* behind and somewhat contracted in front, ornamented with revolving threads and transverse riblets—the rudely square depressions transversely striated.

Tubercles, twelve on the last whorl, bluntly or subacutely conical, trisected by three peripheral liræ; liræ acute, equidistant, about twelve on the penultimate whorl, those on the medial and anterior areas stouter than those on the posterior slope, sometimes with a threadlet in the intervening furrows.

Body whorl with a high posterior slope, bluntly convex on the periphery, thence gradually contracted into a long, broad, almost straight beak. Aperture elongate-oval; outer lip with a thin porcellanous thickening on the slightly crenulated margin, smooth within; inner lip callously spread and adpressed over the columella; columella with two oblique plaits hardly visible from without.

Length, 68; breadth, 25; aperture, length 21, width 10; length of canal, 16.

Localities.—Lower beds at Muddy Creek; gastropod-bed of the River Murray Cliffs; Table Cape (*R. M. Johnston!*).

Each locality has its own racial variety, and it may be desirable, when fuller material is at hand, to apply distinctive names to each.

The type form from Muddy Creek is the most lanceolate, the breadth to the length is as 1 to 2·7; the Murray variety differs by its more angulate whorls, sharp, stout and simple tubercles, and is proportionately broader, the breadth to the length being

1 to 2.5; the extreme of shape is presented by the Table Cape race, which has a shorter spire, more ventricose body-whorl, with large conical tubercles, the breadth to the length is as 1 to 2.2.

5. *Fasciolaria cristata*, *spec. nov.* Plate viii., fig. 4.

Shell fusiform, with a high scalar spire of regularly-increasing whorls, ending in a small mamillate apex of one and a half globose whorls, the extreme tip immersed.

Whorls seven and a half, the posterior spire-whorls bluntly angulated in the middle and costated; the anterior whorls angulated, bisected by a sharp, elevated, compressed keel, which is cut into deep crenatures (about 10 on the body whorl), transversely plicated, coincident with the projections on the keel, from which the plicæ are obliquely directed, vanishing towards the posterior suture, but well developed in front, rounded and continued to the anterior suture. Ornamented with angular unequal liræ (about 20 on the penultimate whorl), and rather closely tessellated by growth-lines.

Body whorl with three strong liræ on the front, with a few primary and secondary threads intervening, cancellated by transverse striæ; base gradually attenuated into a long, somewhat narrow, oblique, spirally lirate beak. Aperture oval, large; columella with three oblique conspicuous plaits, the anterior one the strongest, with one to three inconspicuous posterior plaits; plaits sometimes bifid at their ends.

Dimensions of a medium sized specimen:—Length, 41; breadth, 19; length of aperture, 13; of canal, 11.

Locality.—Lower beds at Muddy Creek.

6. *Fasciolaria cryptoploca*, *spec. nov.* Pl. viii., fig. 2.

Shell fusiform, moderately elongate, with a high scalar spire, ending in a small mamillate apex of one and a half smooth convex whorls.

Whorls nine; the earlier whorls flatly convex, and graduating to tabulated in the two anterior ones. Anterior whorls with nine plications to each whorl; plicæ narrowly rounded, elevated into sharpish conical tubercles at the shoulder, separated by wide, shallow and open furrows, dying out on the posterior slope and on the base of the body whorl; the ornament consists of acute spiral ridges, alternately large and small (about 20 on the penultimate whorl), separated by a little wider angular furrows, roughened by transverse lamellæ of growth.

Aperture oval-oblong; outer lip thin, strongly lirate within; columella with a strong oblique fold, arising from the top of the pillar, and one or two smaller above, not visible from the exterior; canal stout, rather broad, open, slightly bent to the left, and a little reverted.

Length, 46; breadth, 18.5; aperture, length 15, breadth 8.5; length of canal, 13.

Locality.—Lower beds at Muddy Creek.

7. *Fasciolaria rugata*, *spec. nov.* Plate viii., fig. 3.

This species very much resembles *F. cryptoploca*, but differs by its fewer and more rapidly enlarging whorls, which are about equally sloping from the periphery to the sutures; the canal is shorter and strongly twisted.

There are ten sharp plications on each of the anterior whorls, and the encircling liræ (ten to twelve on the penultimate whorl) are equal-sized, and the surface is usually more rugged by the edges of the imbricating lamellæ than in the allied species.

Dimensions of the type specimen, with six and a half whorls:—Length, 45; breadth, 23; length of aperture 17, of canal 10.

Localities.—Blue clays at Schnapper Point; and lower beds at Muddy Creek (*J. Dennant*!).

GENUS PERISTERIA.

I find it convenient to include under this generic title those fusoid shells having a sharply sinistrally bent canal, with one strong fold on the columella, or with two or more slender plaits additional, and others with a short canal having the columella characters, which I cannot with any degree of confidence refer to established genera or subgenera.

Some of the species, by their long slender canals with two or more plaits, differ from *Fasciolaria* only by the obliquity of the beak. *P. approximans* is more typical; whilst the small group of species congregated around *P. succincta* approaches *Tudicula*. Lastly, there are two small Trophon-like shells, with a very short twisted canal, that cannot consistently be referred to *Trophon* on account of the oblique plait on the columella.

Unacquainted with the majority of the genera of the family established on Tertiary fossils by Conrad, Bellardi, and other palæontologists, I refrain from creating new groups out of the heterogeneous assemblage of species which I have brought together under *Peristernia*.

SYNOPSIS OF SPECIES.

Peristome not continuous. Apex subacute or mamillate, smooth.

Whorls angulated, costated.

Stoutly lirate; apex subacute. 1. *P. approximans*.
Last whorl convex, without costæ.

2. *P. purpuroides*.

Finely lirate; apex mamillate.

Whorls equally lirate; apex small.

3. *P. Morundiana*

- Posterior slope without liræ; apex twice the size. 4. *P. Murrayana*.
- Whorls convex, costated.
Costæ broad; canal longer than aperture.
Whorls a little flatted behind. 5. *P. altifrons*.
- Whorls equally contracted. 6. *P. Aldingensis*.
- Costæ slender; canal short. 7. *P. affinis*.
- Whorls convex, not costated.
Cancellated; canal short. 8. *P. transenna*.
- Liræ slender; canal very long, attenuated. 9. *P. lintea*.
- Stoutly lirate, posterior whorls subangulated and
and costated. 2. *P. purpuroides*.
- Peristome not continuous. Apex hemisphæric, radially
ridged.
- Whorls bicarinated. 10. *P. apicilirata*.
- Whorls regularly convex. 11. *P. actinostephes*.
- Peristome continuous; inner lip erect.
Whorls subpyriform; last whorl ventricose. 12. *P. succincta*.
- Whorls fusiform; beak long and slender.
Liræ angular, alternately large and small;
whorls flattened at shoulder. 13. *P. interlineata*.
- Liræ flat; transversely wrinkled. 14. *P. subundulosa*.

1. *Peristernia approximans*, *spec. nov.* Plate ix., fig. 2.

Shell fusiform, solid, of ten angular-convex whorls, ending in a small, subacute apex, provided with eight narrow transverse plications, bent forward on the posterior slope and becoming obsolete on the base of the body whorl. Ornamented with depressed rounded spiral liræ, which are somewhat irregular and unequal, about nine on the posterior slope, decreasing in strength as the suture is approached, about 20 on the medial and front parts of the body whorl; the interstitial spaces are narrower than the liræ, and are pitted by transverse threads, which on the posterior slope appear as crowded imbricating forward-curved lamellæ.

Aperture narrowly ovate; outer lip stoutly lirate within, attenuated and crenatulated at the margin, with an oblique fold at the origin of the canal; columella concave to the slight oblique fold at its junction with the canal; canal rather long, slightly bent to the left, and a little upturned at the extremity.

Length, 27; breadth, 11; length of aperture, 8; of canal, 8.

Localities.—Upper beds at Muddy Creek; oyster banks, Aldinga Cliffs.

This fossil, though not a typical *Peristernia*, cannot well be included under *Trophon* to which its living analogue *P. Paivæ* was originally referred.

Mr. Boog Watson, Zool. Challenger Exped., pt. xlii., p. 194, 1886, writing of *Trophon Hanleyi*, which Mr. Tryon regards as an elate form of *T. Paivæ*, Crosse, says:—"The operculum of this species is not that of *Murex* nor of *Fusus*, still less that of *Urosalpinx*. . . The form of the shell and operculum alike remove it from *Trophon*." In his perplexity he classes it as a *Fusus*. As regards the shell *T. Paivæ* is congeneric with *Siphonalia fuscozonata*, Angas, which Tryon places under *Peristernia*—a position the least objectionable.

Peristernia Paivæ is a variable shell, both as to shape of whorls and length of spire, so also is its fossil representative, and specific differences are not easily definable so as to embrace every individual variation of each. In the living species the whorls are tabulated, and the length of the aperture and canal does not exceed that of the rest of the shell; in *P. approximans* the whorls though angulated are not tabulated, and the length of the aperture and canal is about half as long again as the rest of the shell.

2. *Peristernia purpuroides*, *spec. nov.* Plate ix., fig. 3.

Shell fusiform, stout, whorls seven, apex small, mamillate. Whorls convex, a little contracted at the anterior suture, the posterior whorls faintly transversely ribbed; ornamented with thick spiral liræ, about nine on the posterior whorl, interstices much narrower than the liræ, and transversely striated.

Aperture oval; outer lip strongly lirate within, with a strong fold at the front; inner lip patulous, callously expanded, decurrent on the pillar, which is bounded on the left by a narrow angulated furrow; there is a strong oblique fold arising from the point of the pillar; canal rather short, stout, and broad, bent to the left, and slightly reverted.

Length, 29; breadth, 14; length of aperture 11.5, of canal 6.

Locality.—Upper beds at Muddy Creek (*J. Dennant*!).

The fossil recalls some varietal forms of *Purpura lapillus*, but its canal and plaited columella remove it from that genus; its affinity to *Peristernia approximans* is unquestionable, though not likely to be confounded with it.

3. *Peristernia Morundiana*, *spec. nov.* Plate viii., fig. 7.

Shell ovately fusiform, stout, of seven flatly convex whorls of rather rapid increase, with a rather short conic spire ending in a small mamillate apex of two smooth whorls; the anterior

of the apical whorls is almost flat-sided, the posterior one is globose, with the tip laterally immersed. Whorls bluntly angled and tuberculate behind the anterior suture, the posterior slope is very wide and slightly convex; the tubercles are rounded, widely separated, eight to a whorl, vanishing half-way across the posterior slope, but reaching the anterior suture; spirally lirate, liræ acute, about 20 on the penultimate whorl, alternately large and small on the anterior half, closely striated transversely.

Last whorl medially angulated and tuberculated, gradually attenuated into a broad, open, much curved shortish beak. Aperture oval; outer lip thin, faintly lirate within; columella with a strong plait at the front decurrent on the canal, behind which is a second, and though moderately strong, is hardly visible from without.

Length, 42·5; breadth, 20·5; aperture, length 16, width 9; length of canal, 11.

Locality.—Gastropod-bed of the River Murray Cliffs, near Morgan.

4. *Peristernia Murrayana*, *spec. nov.*

Shell ovately fusiform, whorls six and a half, of rapid increase; spire short conic, ending in a moderately large obtuse apex of two whorls, 1·5 mill. in diameter; for about a third of a whorl from the margin of the pullus the surface is slenderly costated, the posterior whorl is globose, with the tip central and partially immersed.

Whorls bluntly angulated and tuberculated at the anterior suture, the posterior slope very wide and slightly *concave*; tubercles small, eight to a whorl, trisected by three strong liræ; ornamented on the anterior half of the whorl with three or four strong spiral threads, with threadlets in the furrows, the posterior slope with fine spiral and transverse striæ hardly or not at all visible to the unaided eye.

Last whorl subangulated and tuberculated at the periphery, at the base suddenly contracted into a narrow, nearly closed, sinistrally bent canal. Aperture oval; outer lip thin, slightly effuse at the front, faintly lirate within; columella with an oblique conspicuous plait arising from the pillar, and with two to four small linear ridges behind.

Length, 25·5; breadth, 12·25; aperture, length 9, width 6; length of canal 6.

Locality.—One of the commonest fossils in the River Murray Cliffs near Morgan.

This species is much like *P. Morundiana*, but is only about half the size, and differs by its more rapidly increasing whorls, smaller and trisect tubercles, almost smooth on the posterior

slopes, by its more sharply bent attenuated beak, by the posterior denticles on the columella, and by its larger and different pullus.

5. *Peristernia altifrons*, *spec. nov.* Plate x., fig. 1.

Shell fusiform, stout (apex wanting); whorls five, rapidly enlarging; posterior whorls shouldered, the posterior slope very narrow and at first inclined inwards, ornamented by equal liræ and cancellated by straight striæ; with increase of growth the whorls become increasingly convex and plicated. Last whorl tumid in the middle, with seven narrow, somewhat humpy, curved plications on the medial region, spirally lirate. Liræ equidistant, about 20 on the penultimate whorl, with wide interspaces, but on the medial and anterior areas and on the base of the last whorl they are alternately large and small.

Aperture oval; columella with a strong fold at the front, decurrent on the canal; canal stout, apparently of moderate length, curved to the left and reverted.

Length, incomplete, 38; breadth, 18; aperture, length 15, width 7.

Locality.—Gastropod-bed of the River Murray Cliffs.

6. *Peristernia Aldingensis*, *spec. nov.* Plate viii., fig. 8a, 8b.

Shell fusiform, stout, with a high conical spire, ending in a small blunt mamillate apex of two and a half whorls; for about a third of a whorl from the junction with the spire the surface is furnished with linear transverse plications.

Whorls eight and a half, increasing somewhat rapidly, convex, with seven large rounded oblique ribs on each whorl, which die out on the base of the last whorl, separated by broad open furrows. Surface scored by coarse angular spiral threads (about ten on the penultimate whorl), roughened on the edge by close-set transverse striæ, parted by wider furrows, with or without a spiral threadlet. Last whorl with a rounded base prolonged into a longish, sinistrally curved and slightly reverted beak.

Aperture round; outer lip strongly lirate within; columella with a strong oblique plait at the top of the pillar, having a tooth-like termination; a smaller plait is occasionally present behind it.

Fig. 8b represents an extreme elate individual with more defined costations.

Length, 35; breadth, 14.5; length of aperture, 10; of canal, 8.5.

Localities.—Turritella clays, Blanche Point, Aldinga Bay; and Adelaide bore.

7. *Peristernia affinis*, *spec. nov.* Plate xi., fig. 7.

Shell like *P. transenna* but narrower, with strong angular plications, which impart a more convex outline to the whorls. Whorls six, apex decollated; body whorl with twelve transverse ribs, acutely nodulate at the intersection with the liræ. Aperture oval; columella with a strong oblique twist; canal shorter than in *P. transenna*, oblique and slightly twisted; outer lip varicosely thickened a little beyond the edge; stoutly lirate within.

Length, 16.5; breadth, 7; length of aperture and canal, 9.

Locality.—Table Cape (*R. M. Johnston*!).

8. *Peristernia transenna*, *T. Woods*. Plate xi., fig. 10.

Fusus transenna, *T. Woods*, Proc. Roy. Soc. Tasm. for 1876, p. 94.

Shell ovately fusiform with a flat spire, apex wanting; whorls five, flatly convex, subangulate above, equally and widely latticed with arched transverse and spiral threads, raised into short, small conical nodulations at the intersection, the interstices cancellated. There are 24 transverse threads on the body whorl, and five spiral threads on the middle portion of the body whorl.

Aperture oval; columella with a strong oblique twist ascending from the pillar; canal wide, of moderate length, oblique, and slightly reverted; outer lip?

Length (incomplete), 20; breadth, 9; length of aperture and canal, 12.

Locality.—Table Cape (*R. M. Johnston*!).

9. *Peristernia lintea*, *spec. nov.* Plate viii., fig. 11.

Shell ovately fusiform, with a moderately high conical spire ending in a blunt apex of one and a half sub-globose whorls; whorls below the apex four, ornamented by fine spiral threads with two or three striæ in the interspaces, crossed by slender arched growth lines and very fine striæ; last whorl sometimes with short undulations at the periphery.

Outer lip thin, lirate within; columella with a conspicuous oblique fold at the top of the canal succeeded by two or three small ones.

Length, 28; breadth, 10; length of aperture, 9; of canal, 11.

Locality.—Lower beds at Muddy Creek.

This species is distinguished from *Fasciolaria Tenisoni* by its more ventricose body whorl, fine spiral ornament, and slender bent canal.

10. *Peristernia apicilirata*, *spec. nov.* Pl. ix., fig. 14.

Shell small, elongate-fusiform, spire high, of sub-gradated whorls, ending in a large hemispheric apex radially finely

ribbed; whorls below apex four, convex, bicarinated medially, transversely costated.

Costæ thick, seven or eight to a whorl, distant, raised into blunt tubercles on the keels, faintly continued on to the base of the last whorl. Spiral ornament consists of two strong medial threads forming keels, a slender thread on the posterior slope, and one or two at the front of the spire whorls; the whole surface crossed by curved striæ of growth.

Aperture oval; outer lip thin; columella obliquely truncated by a spiral plait; canal very short, wide, curved, and reverted.

Length, 5; breadth, 2; length of aperture and canal, 2.

Localities.—Turritella clays at Blanche Point, Aldinga Bay; clayey-green sands, Adelaide bore.

11. *Peristernia actinostephes*, *spec. nov.* Plate ix., fig. 10.

Similar to *P. apicilirata*; whorls below apex five, regularly convex, with thick humpy costæ, about nine to a whorl, with equal, equidistant spiral threads (six on the penultimate whorl). Outer lip smooth or lirate within; base a little more contracted. Aperture oblong.

Length, 7; breadth, 2.5; length of canal and aperture, 3.

Localities.—Same as the last.

12. *Peristernia succincta*, *T. Woods*.

Trophon succinctus, Tenison-Woods, Proc. Lin. Soc., N.S.W., vol. iv., p. 16, tab. 4, figs. 6, 6a, 1879.

Shell elongate-turbinate, apex blunt, of one and a half small subglobose whorls, the tip somewhat oblique; whorls below the apex 5, convex, somewhat flattened behind; encircled with distant sharp high keels, rudely rugged at the edge, the wide concave interspaces marked with transverse growth-lines and fine spiral striæ.

Keels on the penultimate whorl five or six, of which the two or three medial ones are a little larger and more distant than the rest.

Last whorl somewhat tumid; aperture nearly circular; outer lip slightly dilated, thickened and closely grooved within, bevelled to a sharp undulate edge; inner lip continuous with the outer lip, with a thin erect margin; a strong, oblique plait at the junction with the canal, with a few small denticles behind; canal of moderate length, wide, stout, bent to the left, and much reverted.

Length, 33; breadth, 20; aperture, length 13.5, width 9; canal length 10, width 4.5.

Locality.—Lower beds at Muddy Creek.

13. *Peristernia interlineata*, *spec. nov.* Plate vi., fig. 1.

Shell ovately fusiform, with a moderately high subgradated spire, ending in a blunt apex of one and a half subglobose whorls, the tip depressed. Whorls below the apex four, convex, equally contracted at both sutures, spirally ridged.

Ridges angular, acute, three or four of which on the median portion of the spire whorls forming keels; the broad concave furrows with a thread, crossed by straight distant striae. On the body whorl the ridges are more serrately cut by the transverse striae than those are on the spire.

Aperture oval; outer lip thin, closely and strongly lirated within; peristome continuous; inner lip with a thin erect margin, a strong oblique anterior plait, and a few denticles. Canal long, slender, twisted to the left and reverted.

Length, 23; breadth, 11; length of aperture 8.5, of canal 7.

Locality.—Lower beds at Muddy Creek.

Related to *P. succincta* by its ornament, but it is elongated and has a long tapering canal.

14. *Peristernia subundulosa*, *spec. nov.* Plate viii., fig. 12.

Shell similar to *P. interlineata* but the whorls are regularly convex; the spiral lirae flatly rounded, no interstitial thread in the wider interspaces (about ten on the penultimate whorl); lirae undulose by reason of the obscure, broad, transverse wrinklins. There are two small plaits and a tooth on the columella, in addition to the prominent fold at the junction with the canal.

Length, 23.5; breadth, 11; length of aperture 9, of canal 7.

Locality.—Lower beds at Muddy Creek.

GENUS TUDICULA.

SYNOPSIS OF SPECIES.

Periphery truncated and costated.

rounded, undulose.

angulated, plain.

1. *T. costata*.

2. *T. turbinata*.

3. *T. angulata*.

It is noteworthy that the above-named fossils conform more with the type of the genus (*T. spirillus*) than does any of the living species associated therewith; the recent species, which number five, are confined to the Indo-Australian region. Each of the fossil species has very distinctive characters as compared with *T. spirillus*.

1. *Tudicula costata*, *spec. nov.* Plate x., fig. 9.

Shell globosely conical, with a very short conical spire; apex mamillate of two whorls, erect, and a little lopsided. Surface ornamented with numerous spiral threads alternately large and small and transverse striae. Last whorl truncated at the

periphery, bearing nine curved somewhat humpy costæ, which are crenulated by about six strong spiral threads; base short, rounded, contracted into a long, straightish, slender beak.

Aperture oval; outer lip with a slight callous thickening on the margin, smooth within; inner lip continuous with the outer lip, much thickened, but not spreading, decurrent on the pillar; with a stout oblique plait at the summit of the pillar and a few denticles behind.

Length, 27.5; breadth, 19; aperture, length 12, width 7; length of canal, 13.

Locality.—In a well sinking on the River Murray Desert.

2. *Tudicula turbinata*, *spec. nov.* Plate x., fig. 7.

Shell globosely conical, with a short conical spire of flatly depressed whorls; apex mamillate, erect, of two smooth whorls. Surface ornamented with angular, distant, spiral threads; interspaces angular, with a medial threadlet, coarsely striated spirally, and finely striated transversely.

Last whorl rather ventricose, especially towards the aperture, rounded at the periphery, provided with short thick costæ, ten in number, crenulated by three or four strong liræ; base short, rounded, contracted into a long, straight, slender beak.

Aperture oval; outer lip slightly incurved behind the periphery, where it is much thickened, margin crenulated and scored for a short distance within; inner lip continuous with the outer lip, very much thickened, but not spreading, with a stout oblique plait at the summit of the pillar and five or six denticles behind.

Length, 27 (canal incomplete); breadth, 23; aperture length, 20; width, 11; length of canal, 10 (incomplete). A young specimen measures—length, 22.5; breadth, 8; length of aperture, 8; of canal, 10.

Localities.—Gastropod-bed of the River Murray cliffs, near Morgan; lower beds at Muddy Creek (*J. Dennant*!).

3. *Tudicula angulata*, *spec. nov.* Plate x., fig. 9.

Shell globosely conical, with a short, flatly depressed spire, apex erect mamillate of two smooth whorls. Last whorl angulated at the periphery, ornamented with spiral liræ, irregularly crenulated by oblique growth lines; liræ on posterior slope, nearly equal and equidistant, narrow, rounded, and depressed, the interspaces a little wider; on the front and base the liræ are stronger, wide apart, the interspaces occupied by three or four threadlets.

Aperture as in *T. turbinata*, except that there are no denticles behind the columella-plait.

Length, less the canal, 16; breadth, 15·5; aperture, length, 11; width, 6·5.

Locality.—Lower beds at Muddy Creek.

GENUS DENNANTIA.

Name in compliment to Mr. J. Dennant, F.G.S., who has placed his very extensive collection of the Muddy Creek fossils at my service.

Type.—*Fusus Ino*, *Tenison Woods*.

Generic Characters.—Shell elongate, turriculate; aperture prolonged into a moderately long, sharply bent and reverted canal; columella with an oblique fold ending at the point of the pillar in a tooth-like projection; base of body whorl with a revolving ridge coincident with the posterior angle of the mouth and ending in a pointed projection on the thin outer lip.

This genus combines the form of *Fastigiella* with the aperture of *Leucozonia* and the canal of *Peristernia*.

SYNOPSIS OF SPECIES.

Lirately ridged or striated.

1. *D. Ino*.

Spirally furrowed.

2. *D. cingulata*.

1. *Dennantia Ino*, *T. Woods*. Pl. xii., figs. 1a—1c and 3.

Fusus Ino, *Tenison-Woods*, Proc. Lin. Soc., N.S.W., vol. iv., p. 13, tab. 3, fig. 10, 1879.

Shell elongate-turriculate, rather stout; whorls eight and a half, of moderate increase, ending a rather large obtuse apex of two and a half smooth tumid whorls with the tip depressed and centrally immersed.

Anterior whorls convex, suture well impressed, encircled with slender, acute liræ (about seven on the penultimate whorl, but the number is very variable), the wide interspaces with spiral threads and microscopic transverse closely-set striæ, arched growth-lines and indistinct folds occur at irregular intervals.

Body whorl regularly convex to the basal keel, then suddenly contracted into a moderately long twisted beak.

Aperture ovate; outer lip thin, interrupted by the projection of the basal keel, behind which it is slightly incurved, lirate within; inner lip defined behind by an impressed line continued to near the extremity of the canal, provided with an oblique fold arising from a short denticle at the junction with the canal.

Length, 26·5; breadth, 10; length of aperture 8, of canal 6.

Localities.—One of the commonest fossils in the lower beds at Muddy Creek; blue clays at Schnapper Point; Gastropod-bed of the River Murray Cliffs, near Morgan.

Mr. Tenison-Woods founded this species on a young example

with much of the outer lip broken away, and as the whole aspect is so totally different from a perfect matured shell it was needful to refigure the species, and for this purpose I selected a specimen which agreed the best with the original diagnosis. The species is subject to much variation; examples from the River Murray Cliffs are much shorter and broader than the type, an extreme form having a breadth equal to half the length. Fig. 3 on tab. 12 represents a variety common at Schnapper Point, in which the encircling ridges are very prominent and angular, and somewhat roughened by the intercrossing of growth-folds.

2. *Dennantia cingulata*. Plate xii., figs. 2 and 5a—5b.

A rather more slender form than *D. Ino*, with linear encircling furrows. In the form represented by fig. 2, the broad surface is simply scored by lines, whilst in the form represented by fig. 5 the grooving is deep and moderately broad, though not so wide as the rounded ridges. Now and again a thread appears in the furrows.

Locality.—Blue clays, Schnapper Point.

GENUS LEUCOZONIA.

SYNOPSIS OF SPECIES.

- | | |
|--|--------------------------|
| Shell pyriform; spiral striae microscopic. | 1. <i>L. micronema</i> . |
| Shell ovate-globose; spiral ornament of fine distant threads and striae. | 2. <i>L. staminea</i> . |
| Shell globosely turbinate; lirae stout, close. | 3. <i>L. tumida</i> . |

1. *Leucozonium micronema*, *spec. nov.* Plate ix., fig. 12.

Shell small, pyriformly ovate, apex mamillate of one and a half whorls, the tip obliquely depressed. Whorls below the apex three, slightly overlapping behind, concealing the suture; microscopically wavy-striated in a spiral direction, the striae hardly visible on the base of the last whorl; marked transversely by striae and linear folds of growth.

Aperture elongate-oval; outer lip lirate within, margin (?); columella with six narrow, nearly transverse plaits, rather close together, decreasing in size from the front, the anterior one much the largest; canal short, stout, wide, straight, a little upturned at the end.

Length, 11; breadth, 6; length of canal and aperture, 8.

Locality.—Blue clays at Schnapper Point.

This little fossil is apparently congeneric with *Buccinum rostratum*, Wood, the generic position of which is very doubtful, but placed by Gray in his genus *Leucozonium* under the sub-generic title of *Lagenia*.

2. *Leucozonia staminea*, *spec. nov.* Pl. ix., fig. 13.

Shell small, ovately globose, apex a little eccentric, mamillate of one and a half whorls, flattened down at the tip. Whorls below the apex four; ornamented with distant, slender spiral threads, the interspaces about 1 mill. wide on the body whorl, occupied by close fine striæ; a few of the liræ towards the base are irregularly granulated. Aperture oval; outer lip thin, lirate within; columella with three close, equal, slightly oblique plaits at the front, each ending in a tooth-like projection, a narrow umbilical chink behind the pillar; canal short, bent to the left, and reverted.

Length, 12; breadth, 7·5; length of aperture and canal, 8.

Locality.—Blue clays at Schnapper Point.

3. *Leucozonia tumida*, *spec. nov.* Pl. xiii., fig. 2.

Shell small (immature?), globosely turbate, ventricose; apex mamillate of two subglobose whorls; whorls four in all; last whorl ventricose, with equidistant angular threads, finely cancellated in the furrows by two or three spiral threadlets and transverse striæ.

Outer lip faintly lirate within; three nearly equal sized plaits at the fore part of the columella; canal short, much twisted, and reverted.

Length, 10·5; breadth, 7·5; length of aperture and canal, 8.

Locality.—Lower beds at Muddy Creek. (*J. Dennant*!).

GENUS ZEMIRA.

1. *Zemira præcursoria*, *spec. nov.* Plate xi., fig. 5.

Shell ovate, stout; whorls five and a half, ending in a smooth mamillate apex, rounded, deeply channelled at the suture; sculptured with revolving incised lines (about ten on the penultimate whorl), the posterior of which are more prominent; whole surface slightly wrinkled and striated transversely.

Last whorl with a revolving channel in an alignment with the posterior angle of the aperture, and terminating at the anterior third of the outer lip in a tooth-like projection; in front of the channel are six prominent, rounded, spiral ribs much wider than the interspaces, whilst the posterior area is sculptured as the penultimate whorl.

Aperture ovate, slightly angulated posteriorly; inner lip with a slight callous extension, partially concealing the narrow umbilicus, which is margined by a strong, rounded, striated rib; columella smooth, compressed, terminating in a transverse tooth-like fold; anterior canal reduced to a mere notch; outer lip thin, the part anterior to the tooth-like projection is crenately wrinkled.

Length, 21; breadth, 13; length of aperture, 14.

Locality.—Lower beds at Muddy Creek (*J. Dennant*!).

The discovery of a fossil species of *Zemira* is of interest from the circumstance that the genus has hitherto been known by one species, *Z. australis*, Sow., inhabiting the temperate seas of Eastern Australia, from which it differs by its longer spire and narrower body whorl, narrower sutural sulcus, and by the more pronounced encircling ridges.

GENUS PISANIA.

SYNOPSIS OF SPECIES.

Turriculate, slenderly cancellate, canal long.

1. *P. rostrata*.

Ovate-fusiform, coarsely cancellate, whorls convex.

2. *P. semicostata*.

thick oblique costæ, whorls convex.

3. *P. obliquecostata*.

whorls bicarinate, cancellated.

4. *P. purpuroides*.

Ovate-conical, strongly costated and liriate, margined at the suture.

5. *P. brevis*.

1. *Pisania rostrata*, *spec. nov.* Plate x., fig. 10.

Shell elongate-ovate, fusiform, with a high conical spire, abruptly attenuated at the base into a stout beak (long for the genus). Apex very small of two rounded whorls, the tip obliquely depressed. Whorls below the apex six, convex, spirally liriate with depressed rounded threads alternately large and small (about 20 on the penultimate whorl); posterior whorls with crowded slender costæ, about 24 on the antepenultimate whorl, which vanish at the penultimate whorl. Last whorl varicosely dilated behind the aperture; base rounded, rather sharply contracted into a broad, slightly oblique, much-upturned beak.

Aperture oval-oblong; outer lip with a thin margin, strongly ridged within; inner lip with a circumscribed callous cover continued down the pillar, behind which is a shallow narrow groove; a bifid callosity on the body wall near the posterior angle of the aperture; a strong oblique plait ends in a blunt tooth-like projection at the top of the canal.

Length, 25; breadth, 10; length of aperture, 8; of canal, 5.

Locality.—Upper beds at Muddy Creek (*J. Dennant*!).

This species is conspicuous amongst living congeners by its abruptly contracted base and long beak.

2. *Pisania semicostata*, *spec. nov.* Plate iv., fig. 9.

Shell oblong-fusiform, similar to *P. rostrata*, with more

rapidly increasing whorls, base less abruptly attenuated, canal shorter, costæ fewer and stouter. Whorls below the apex four, costæ slightly curved, rounded, about as wide as the interspaces, 16 on the penultimate whorl, obsolete or only faintly developed on the body whorl.

Length, 19·5; breadth, 8·5; length of aperture, 7; of canal, 3.

Locality.—Upper beds at Muddy Creek (*J. Dennant*!).

3. *Pisania obliquecostata*, *spec. nov.* Plate ix., fig. 7.

Shell small, narrow-ovate, thick; whorls five, slightly convex, strongly costated and lirate. Costæ rather narrow, rounded, high, distant, oblique, about eight to a whorl; liræ stout, distant, four on the penultimate whorl, more or less tuberculated on the costæ.

Aperture varicosely dilated; six stout denticles within the outer lip; columella truncated by an oblique fold; canal short, stout, a little oblique.

Length, 7; breadth, 3; length of aperture and canal, 3·5.

Locality.—Upper beds at Muddy Creek.

4. *Pisania purpuroides*, *Johnston*. Plate xi., fig. 6.

Ricinula purpuroides, R. M. Johnston, Proc. Roy. Soc., Tasmania for 1879, p. 33.

Shell small, solid, obtusely and narrowly ovate. Whorls six, those of the spire obtusely angulated and bicarinated, with an impressed suture, transversely costated, spirally lirate, and finely cancellated between the costæ. There are two strong encircling carinæ, one median and a second about midway to the anterior suture, whilst a third, less prominent, is at the posterior suture; in the concave interspaces between the liræ there are one, two, or three fine spiral threads.

Last whorl moderately convex, with about seven equal and equidistant stout liræ, having about three threads in each interspace.

The costæ (eleven on the penultimate and eight on the body whorl) are raised into blunt nodulations at the points of intersection with the stouter liræ.

Aperture narrowly ovate; outer lip varicosely dilated behind, slightly crenulated on the acute margin, and with seven tooth-like ridges within; inner lip spreading over the columella and thinly continuous with the outer lip, with one elongated plication near the posterior angulation and about eight small irregular callosities thence to the point of the pillar. Canal short, wide, oblique, and slightly reverted.

Length, 12; breadth, 6; length of aperture and canal, 7.

Locality.—Table Cape, Tasmania (*R. M. Johnston*!); lower beds at Muddy Creek.

5. *Pisania brevis*, *spec. nov.* Pl. ix., fig. 8.

Shell ovately conical; whorls six, angularly convex, a little contracted in front, strongly costated and lirate.

Costæ narrow, acutely rounded, distant, slightly oblique, about ten to a whorl, more or less crenulated by the liræ. Liræ on the body whorl alternately stout and slender, two very stout ones on the angulation; suture margined by two confluent liræ.

Aperture somewhat varicosely dilated; outer lip lirate within; columella truncated by an oblique fold behind, which is denticulated; canal short, stout, slightly oblique.

Length, 10; breadth, 5.5; length of aperture and canal, 6.

Locality.—Upper and lower beds at Muddy Creek.

GENUS CANTHARUS.

1. *Cantharus varicosus*, *spec. nov.* Plate viii., fig. 10.

Shell ovate, subfusiform, whorls five and a half, flatly convex, variced, of rapid increase, apex of one and a half small smooth rounded whorls, the tip immersed.

Posterior whorls spirally deeply grooved; anterior whorls with thick spiral ridges, about eight on the penultimate whorl, broken up into thick, elongate, regularly disposed granules, with a slender thread in the narrow interspaces; on the body whorl the granulation is not so regular, and the interstitial thread is conspicuous. Varices five.

Aperture oblong; outer lip varicosely dilated, margin sharp, with a thick, stoutly denticulate band within, the front sharply curved to the short, sinistrally curved, emarginate beak; inner lip and pillar with a thin porcellaneous coat tuberculate all over.

Length, 17.5; breadth, 9.5; length of aperture and canal, 12.

Locality.—Turritella-clays, Blanche Point, Aldinga Bay.

GENUS PHOS.

SYNOPSIS OF SPECIES.

Apex acutely conical.

Whorls convex, a little flattened behind.

1. *P. tardicrescens*.

Apex subcylindrical or turbinate.

Whorls convex, not shouldered.

Costæ slender, liræ strong.

2. *P. liræcostatus*.

Costæ feeble, liræ faint.

3. *P. cominelloides*.

Costæ and liræ strong.

4. *P. Gregsoni*.

Whorls shouldered and tuberculated.

5. *P. tuberculatus*.

Apex mamillate, obtuse.

Whorls tabulated, aperture variced.

6. *P. variciferus*.

1. *Phos tardicrescens*, *spec. nov.* Plate x., fig. 12.

Shell pyramidal, stout, whorls eleven, convex, closely ribbed and lirate; apex conical of five smooth slightly convex whorls of very slow increase.

Whorls below those of the apex of very slow increase, the posterior ones narrow, and regularly convex, gradually becoming more and more depressed behind. Last whorl small and narrow, with a high slightly declining and rounded shoulder defined by a blunt angulation; base short, rounded, ending in a short, strongly twisted, reverted beak.

Transverse ribs slightly oblique, low, broadish, elevated at the shoulder of the anterior whorls into ill-defined cuneate tubercles, 14 to a whorl. The spiral ornament consists of about 20 thin threads, unequal and inequidistant with wider interspaces; the intercostal spaces are rudely cancellated.

Aperture round; outer lip thin, with about 20 spiral ridges within.

Length, 21; breadth, 11; length of aperture and canal, 10.

Locality.—Lower beds at Muddy Creek (*J. Dennant*!).

2. *Phos liræcostatus*, *T. Woods*. Plate xi., fig. 12.

Cominella lyræcostata, *T. Woods*, Proc. Roy. Soc., Tasm., for 1876, p. 108.

Shell long, narrow, fusiform, closely and narrowly ribbed, conspicuously lirate; whorls eight, flatly convex; apex blunt, turbinate of three rounded smooth whorls, the anterior two high, the terminal one small.

Whorls below the apex short and convex, of very slow increase; suture deep and margined. Last whorl small, with a longish rounded base, ending in a twisted, slightly reverted beak.

Transverse ribs narrow, rounded, crenulated, about 16 to a whorl, more conspicuous on the posterior whorls, almost obsolete on the last whorl. Liræ very prominent, distant, six to ten on the penultimate whorl; intercostal spaces finely cancellate. Aperture oval; outer lip acute, faintly lirate within.

Length, 19; breadth, 7; length of aperture and canal, 7.

Locality.—Table Cape (*R. M. Johnston*!).

3. *Phos cominelloides*, *spec. nov.* Plate iv., fig. 11.

Shell elongate-pyramidal; whorls seven and a half, convex, distantly ribbed and faintly lirate; apex blunt, conoidally cylindrical, of three and a half smooth whorls. Whorls below those of the apex narrow at first, flatly convex, increasing in convexity towards the front, with a slight narrow concave depression in front of the suture, defined by a blunt angulation.

Last whorl small, with a rather short rounded base ending in a twisted reverted, emarginate beak.

Transverse ribs, narrow, rounded, ill-defined, except on the posterior whorls, about 12 to a whorl. Spiral liræ thick, depressed, inconspicuous, about seven on the medial and posterior areas of the penultimate whorl; obsolete on the middle of the last whorl, but prominent on its base. Whole surface closely transversely striated.

Aperture oval; outer lip thin, slightly insinuated behind the shoulder, without, about 20 slender spiral ridges within.

Length, 20; breadth, 8; length of aperture and canal, 10.

Locality.—Lower beds at Muddy Creek.

4. *Phos Gregsoni*, *spec. nov.*

Shell similar to *P. cominelloides*, but the whorls are subangularly convex by reason of the largely developed costæ; the basal whorl is narrower, and the apex is different, which consists of three high turbinated whorls, and is rendered conspicuous by the disproportionate increase in size of the whorl next below it.

The costæ are rounded, distant, eight to a whorl, vanishing behind the shoulder, but are continued to the base of the body whorl. Spiral liræ, about six, depressed, equal and equidistant on the posterior slope of the penultimate whorl, about twelve alternately large and small on the rest of the whorl. Outer lip not insinuated behind the shoulder.

Length, 19; breadth, 8·5; length of aperture and canal, 8·5.

Localities.—Jemmy's Point and Cunninghame, Gippsland (*W. H. Gregson*!).

Species-name in compliment to Mr. Gregson, of Bairnsdale, to whom I am indebted for the gift of this and other species of the Gippsland Tertiary beds.

5. *Phos tuberculatus*, *spec. nov.* Plate x., fig. 5.

Shell ovately pyramidal, stout, costated and lirate, with a rather high graduated spire, ending in a subcylindrical apex of three smooth whorls. Whorls below the apex, five, of rather rapid increase, short, with a high rounded shoulder concave behind.

Costæ, about 11 to a whorl, thick, rounded, equidistant, prominent only on the angulation, faintly prolonged to the anterior suture of the spire whorls; crenulated by conspicuous liræ; liræ on body whorl confined to the angulation and to the base.

Aperture oblong; outer lip acute, smooth within; beak short, twisted, reverted, and emarginate.

Length, 22; breadth, 10·5; length of aperture and canal, 11.

Locality.—Upper beds at Muddy Creek (*J. Dennant*!).

6. *Phos* (?) *variciferus*, *spec. nov.* Pl. xi., fig. 3.

Shell turriculate, with a high gradated spire, ending in a small obtuse apex of one and a half convex whorls, the extreme tip of which is somewhat obliquely flattened down.

Whorls below those of the apex six, of very slow increase, sharply angled a little beyond the middle, with a straight upward slope to the posterior suture, slightly contracted into the anterior suture.

Spiral liræ, thick, rounded, five on the posterior slope and about eight stronger ones on the front, crossed by close-set fine striae. Transverse costæ, slender, sharp, bent at the keel, about 20 to a whorl, raised into small, blunt knobs on the keel and crenulated by the liræ, especially on the anterior slope; on the last whorl the costæ descend from the keel in a sigmoid curve to the beak.

Last whorl variced immediately behind the outer lip, and besides there are variceal imbrications, usually about two to a whorl.

Aperture narrow oblong; outer lip thin, faintly lirate within; inner lip continuous with the outer lip at all stages of growth, its edge upraised, markedly so on the pillar, with an umbilical chink at the origin of the canal, smooth within. Canal short, open, twisted to the left and much reverted.

Length, 22; breadth, 9.5; length of canal and aperture, 11.5.

Localities.—Lower beds at Muddy Creek; blue clays at Schnapper Point; Gastropod-bed of the River Murray Cliffs, near Morgan.

The genus under which to class this species has been selected with some hesitation. Its shape and variceal characters approach it to *Epidromus*, particularly through *E. turritus*, mihi, but the distortion of the short beak is adverse to such association. The entire peristome and variced outer lip suggest a reference to *Nassaria*, which has, however, teeth on the pillar and much different shape; with *Phos* it agrees in contour and in the short twisted beak, but it lacks the characteristic basal groove of the pillar, and otherwise differs by its variced and entire aperture.

FAMILY NASSINÆ.

GENUS NASSA.

SYNOPSIS OF SPECIES.

- Inner lip with a rugose callus; outer lip denticulated within,
with a marginal varix (subg. HIMA). 1. *N. Tatei*.
Inner and outer lips smooth; variced externally (subg.
PHRONTIS). 2. *N. crassigranosa*.

Inner lip with a large rugose callus; outer lip dentate, not variced externally (subg. *NIOTHA*). 3. *N. sublirella*.

1. *Nassa Tatei*, *T. Woods*. Plate xii., fig. 9.

Nassa Tatei, Tenison Woods, Proc. Lin. Soc. N.S.W., vol. iii., p. 230, t. 21, fig. 13, 1878; id. vol. iv., t. 2, f. 2, 1879.

Shell ovate or elongate-ovate of eight regularly increasing whorls; apex mamillate of four smooth regular whorls; the rest of the spire whorls regularly convex, with an impressed suture, cancellated with sharp raised costæ and flat spiral liræ granulated at the intersections. There are about 15 to 20 costæ on the penultimate whorl, but rapidly diminish in number posteriorly; there are seven principal liræ on the penultimate whorl, sometimes with a thread in one or more of the interspaces, the two contiguous liræ next the suture are usually less stout than the rest.

Aperture oblong-ovate, the outer lip being narrowly truncate at the front. Outer lip with a marginal varix, but elongate examples, such as figured by me, have a varix at or about in an alignment with the columella, inner lip expanded and reflected with a conspicuous posterior plait, and one or more rugosities at the front.

Length, from 7·5 to 8·5; breadth, 3·5.

Localities.—Lower beds, very rare in upper beds, at Muddy Creek; Gastropod-bed of the River Murray Cliffs, near Morgan; blue clays at Schnapper Point, Port Philip.

This species is the fossil analogue of *N. compacta*, Angas, which is the Australian representative of the European *N. incrassata*. *N. Tatei* is more elevated, has numerous and finer costulations than *N. compacta*, and moreover has a large pullus of four whorls, and not of two. Professor Hutton in Proc. Lin. Soc., N.S.W., 1886, p. 481, has referred his *N. socialis* to this species; but the two shells are distinct; the New Zealand fossil has the whorls channelled at the suture, and has usually only four liræ on the penultimate whorl, of which the one next to the posterior suture is small; other less conspicuous distinctive characters are present.

The illustration of this species by Mr. Woods on plate 21, fig. 13, op. cit., is very imperfect, but that on plate 2, fig. 2, op. cit., very well represents an exceedingly immature shell. The figure accompanying this description is that of a senile example of rather unusual length.

2. *Nassa crassigranosa*, *spec. nov.* Pl. xii., figs. 6a, 6b.

Shell stout, ovately conical; spire regular (except in senile examples) of rapidly decreasing subgradated whorls; apex acute, of two smooth minute whorls. Whorls 7; the ordinary spire

whorls convexly angular, with three nodular bands, one at the posterior suture, one median, and the third at about half the distance between the keel and the anterior suture.

Last whorl transversely obliquely costated and nodulated by spiral ridges. Costæ about 10—12; liræ eight, the one next the suture is separated from the keel by a wider space than that which intervenes between the succeeding ones.

Aperture oval, large, variced externally; outer lip smooth within; inner lip smooth, slightly reflected, callously extending posteriorly; columella sharply and obliquely truncated.

Senile examples occur which have added another whorl (as fig. 6*b*), and by reason of the posterior varix has a somewhat distorted spire.

Dimensions of an ordinary full grown example—Length, 14; breadth, 8.5. Of a senile example—Length, 17; breadth, 10.

Localities.—One of the most characteristic fossils in the upper beds at Muddy Creek, very rare and small in the uppermost portion of the lower series; Jemmy's Point, Cunninghame and other localities in Gippsland (*W. H. Gregson*!).

This species seems to resemble *N. granifer*, Kiener, but the callus of the inner lip is very restricted.

3. *Nasa sublirella*, *spec. nov.*

Shell small, ovate, with the costæ cut into nodules by revolving ridges, four on the penultimate whorl; outer lip tuberculate within, the posterior tubercle much larger than the rest; inner lip callously reflected, tuberculate. It resembles stumpy specimens of *N. lyrella*, Beck, but the body whorl is not so inflated, and the spire is longer; the spiral ribs on the body whorl are usually eight, not ten, and the nodulations are larger and well defined, not confluent, as is generally the case in *N. lyrella*; and whilst in the latter species the costæ towards the lip usually fade away before reaching the base, in the fossil species they are continued to the base.

Length, 9.5; breadth, 6.

Locality.—Upper beds at Muddy Creek.

EXPLANATION OF PLATES.

N.B.—The figures are of the natural sizes, except when otherwise stated.

Plate I.

1. *Typhis disjunctus*, *Tate*. Muddy Creek. Enlarged.
2. *Typhis acanthopterus*, *Tate*. Schnapper Point. Enlarged.
3. *Murex (Ocinebra) biconicus*, *Tate*. Murray Desert.

4. *Murex* (*Pteronotus*) *trinodosus*, *Tate*. Muddy Creek. Enlarged.
5. *Murex* (*Ocinebra*) *prionotus*, *Tate*. Adelaide. Enlarged.
6. *Typhis* *evaricosus*, *Tate*. Muddy Creek. Enlarged.
7. *Murex* (*Pteronotus*) *rhysus*, *Tate*. Schnapper Point.
8. *Murex* (*Pteronotus*) *velificus*, *Tate*. Schnapper Point.
9. *Murex* (*Pteronotus*) *manubriatus*, *Tate*. Adelaide.
10. *Typhis* *laciniatus*, *Tate*. Muddy Creek. Enlarged.
11. *Murex* (*Pteronotus*) *calvus*, *Tate*. Aldinga.
12. *Murex* (*Pteronotus*) *bifrons*, *Tate*. Adelaide.

Plate II.

1. *Trophon* *hypsellus*, *Tate*. Adelaide. Much enlarged.
2. *Murex* (*Ocinebra*) *tridentatus*, *Tate*. Aldinga. Much enlarged.
3. *Trophon* *icosiphyllus*, *Tate*. Adelaide. Much enlarged.
4. *Murex* (*Chicoreus*) *Adelaidensis*, *Tate*. Adelaide. Enlarged.
5. *Murex* (*Chicoreus*) *lophœssus*, *Tate*. Schnapper Point.
6. *Murex* (*Chicoreus*) *tenuicornis*, *Tate*. Adelaide. Enlarged.
7. *Murex* (*Chicoreus*) *Dennanti*, *Tate*. Muddy Creek. Slightly enlarged.
8. *Rapana* *aculeata*, *Tate*. Schnapper Point.
9. *Murex* (*Chicoreus*) *basinictus*, *Tate*. R. Murray Cliffs.
10. *Murex* (*Rhinacantha*) *asteriscus*, *Tate*. Muddy Creek. Slightly enlarged.
11. *Murex* (*Rhinacantha*) *pachystirus*, *Tate*. R. Murray Cliffs. Slightly enlarged.
12. *Murex* (*Chicoreus*) *amblyceras*, *Tate*. Schnapper Point. Slightly enlarged.

PLATE III.

1. *Murex* (*Ocinebra*) *asperulus*. *Tate*. Schnapper Point.
2. *Murex* (*Ocinebra*) *camplytropis*, *Tate*. Schnapper Point.
3. *Murex* (*Phyllonotus*) *sublævis*, *Tate*. Aldinga.
4. *Murex* (*Ocinebra*) *monotropis*, *Tate*. Adelaide. Much enlarged.
5. *Murex* (*Ocinebra*) *crassiliratus*, *Tate*. Muddy Creek. Enlarged.
6. *Murex* (*Chicoreus*) *Hamiltonensis*, *Tate*. Muddy Creek.
7. *Sipho* *labrosus*, *Tate*. Enlarged. Muddy Creek.
8. *Sipho* *crebrigranosus*, *Tate*. Enlarged. Muddy Creek.
9. *Fusus* *incompositus*, *Tate*. Aldinga. Enlarged.
10. *Fusus* *Aldingensis*, *Tate*. Aldinga. Enlarged.
11. *Fusus* *tholoides*, *Tate*. Enlarged.

12. *Murex* (*Ocinebra*) *alveolatus*, *Tate*. Muddy Creek. Much enlarged.
13. *Murex* (*Ocinebra*) *trochispira*, *Tate*. Muddy Creek. Much enlarged.
14. *Typhis tripterus*, *Tate*. Adelaide.
15. *Fusus hexagonalis*, *Tate*. Muddy Creek. *b*, Apex enlarged.

PLATE IV.

1. *Bela sculptilis*, *Tate*. Muddy Creek. *b*, Ornament on shoulder enlarged.
2. *Bela pulchra*, *Tate*. Muddy Creek. *b*, Ornament on shoulder enlarged.
3. *Bela Woodsii*, *Tate* (*Cominella cancellata*, Woods). Table Cape.
4. *Epidromus turritus*, *Tate*. Muddy Creek.
5. *Siphonalia spatiosa*, *Tate*. Muddy Creek.
6. *Epidromus citharellus*, *Tate*. Muddy Creek.
7. *Bela crassilirata*, *Tate*. Muddy Creek.
8. *Murex* (*Phyllonotus*) *Eyrei*, *T. Woods*. Muddy Creek. *b*, Sculpture, and *c*, apex much enlarged.
9. *Pisania semicostata*, *Tate*. Muddy Creek.
10. *Epidromus leptoskeles*, *Tate*. Muddy Creek. Enlarged.
11. *Phos cominelloides*, *Tate*. Muddy Creek.
12. *Cominella pumila*, *Tate*. Adelaide. Enlarged.
13. *Murex* (*Pteronotus*) *didymus*, *Tate*. Schnapper Point.

PLATE V.

1. *Triton armatus*, *Tate*. Murray Desert.
2. *Triton tumulosus*, *Tate*. Muddy Creek.
3. *Triton annectans*, *Tate*. Muddy Creek.
4. *Triton Woodsii*, *Tate*. Muddy Creek. *b*. Apex enlarged.
5. *Triton cribrosus*, *Tate*. Adelaide.
6. *Triton Woodsii*, var., *Tate*. River Murray Cliffs.
7. *Triton tortirostris*, *Tate*. Schnapper Point.
8. *Triton radialis*, *Tate*. River Murray Cliffs.
9. *Triton gibbus*, *Tate*. Schnapper Point.
10. *Triton protensus*, *Tate*. Muddy Creek.
11. *Triton cyphus*, *Tate*. Schnapper Point.
12. *Triton textilis*, *Tate*. Muddy Creek.

PLATE VI.

1. *Peristernia interlineata*, *Tate*. Muddy Creek. Slightly enlarged.
2. *Trophon torquatus*, *Tate*. Aldinga. *a*. The shell much enlarged; *b*. Apex magnified.
3. *Murex* (*Chicoreus*) *irregularis*, *Tate*. Muddy Creek. Slightly enlarged.

4. *Vitularia curtansata*, *Tate*. Muddy Creek. Enlarged.
5. *Sipho asperulus*, *Tate*. Muddy Creek. Enlarged.
6. *Ranella* (*Argobuccinum*) *Prattii*, *T. Woods*. Muddy Creek.
7. *Triton oligostirus*, *Tate*. Adelaide. Enlarged.
8. *Triton gemmulatus*, *Tate*. Muddy Creek. *a*. Enlarged ;
b. Magnified ornament.
9. *Triton sexcostatus*, *Tate*. Aldinga. Enlarged.
10. *Epidromus texturatus*, *Tate*. Schnapper Point. *b*. Ornament enlarged.
11. *Epidromus nodulatus*, *Tate*. Adelaide. Enlarged.
12. *Epidromus tenuicostatus*, *T. Woods*. Muddy Creek. Enlarged.

PLATE VII.

1. *Fusus spiniferus*, *Tate*. River Murray Cliffs.
2. *Fusus dictyotis*, *Tate*. Schnapper Point.
3. *Fusus senticosus*, *Tate*. Muddy Creek. Slightly enlarged.
4. *Fusus craspedotus*, *Tate*. Muddy Creek.
5. *Fusus aciformis*, *Tate*. Schnapper Point. *b*. Magnified ornament.
6. *Fusus dictyotis*, var., *Tate*. River Murray Cliffs.
7. *Fusus acanthostephes*, *Tate*. Schnapper Point.
8. *Fusus bulbodes*, *Tate*. Schnapper Point.
9. *Pseudovaricia mirabilis*, *Tate*. Muddy Creek. *b*. Apex enlarged.
10. *Fusus foliaceus*, *Tate*. Muddy Creek.

Plate VIII.

1. *Fasciolaria decipiens*, *Tate*. Muddy Creek.
2. *Fasciolaria cryptoploca*, *Tate*. Muddy Creek.
3. *Fasciolaria rugata*, *Tate*. Schnapper Point.
4. *Fasciolaria cristata*, *Tate*. Muddy Creek.
5. *Siphonalia lamellifera*, *Tate*. Schnapper Point.
6. *Fasciolaria concinna*, *Tate*. Schnapper Point.
7. *Peristernia Morundiana*, *Tate*. River Murray Cliffs.
8. *Peristernia Aldingensis*, *Tate*. *a*, Aldinga ; *b*, variety, Adelaide.
9. *Fusus cochleatus*, *Tate*. Aldinga.
10. *Cantharus varicosus*, *Tate*. Aldinga.
11. *Peristernia lintea*, *Tate*. Muddy Creek.
12. *Peristernia subundulosa*, *Tate*. Muddy Creek.

Plate IX.

1. *Fusus dumetosus*, *Tate*. Muddy Creek. Enlarged.
2. *Peristernia approximans*, *Tate*. Muddy Creek. Enlarged.
3. *Peristernia purpureoides*, *Tate*. Muddy Creek. Enlarged.

4. *Triton ovoideus*, *Tate*. Muddy Creek. Enlarged.
5. *Triton intercostalis*, *Tate*. Muddy Creek.
6. *Trophon anceps*, *Tate*. Aldinga. Slightly enlarged.
7. *Pisania obliquecostata*, *Tate*. Muddy Creek. Much enlarged.
8. *Pisania brevis*, *Tate*. Muddy Creek. Enlarged.
9. *Trophon brevicaudatus*, *Tate*. Muddy Creek. Much enlarged.
10. *Peristernia actinostephes*, *Tate*. Adelaide. Much enlarged.
11. *Cominella pertusa*, *Tate*. Adelaide. Much enlarged.
12. *Leucozonia micronema*, *Tate*. Schnapper Point. Enlarged.
13. *Leucozonia staminea*, *Tate*. Schnapper Point. Enlarged.
14. *Peristernia apicilirata*, *Tate*. Adelaide. Much enlarged.

PLATE X.

1. *Peristernia altifrons*, *Tate*. River Murray Cliffs.
2. *Fusus simulans*, *Tate*. River Murray Cliffs. *a*, Young shell enlarged; *b*, spire of older shell, natural size.
3. *Fasciolaria exilis*, *Tate*. River Murray Cliffs. Enlarged.
4. *Cominella crassina*, *Tate*. Muddy Creek.
5. *Phos tuberculatus*, *Tate*. Muddy Creek. Slightly enlarged.
6. *Cominella subfilicea*, *Tate*. Aldinga. Slightly enlarged.
7. *Tudicula turbinata*, *Tate*. River Murray Cliffs.
8. *Tudicula costata*, *Tate*. Murray Desert.
9. *Tudicula angulata*, *Tate*. Muddy Creek.
10. *Pisania rostrata*, *Tate*. Muddy Creek. Enlarged.
11. *Trophon mangelioides*, *Tate*. River Murray Cliffs. Much enlarged.
12. *Phos tardicrescens*, *Tate*. Muddy Creek. Enlarged.
13. *Fusus sculptilis*, *Tate*. Adelaide. Much enlarged.
14. *Murex minutus*, *Johnston*. Table Cape. Much enlarged.

PLATE XI.

1. *Cominella Clelandi*, *Tate*. Aldinga.
2. *Melanopsis Pomahaka*, *Hutton*. Muddy Creek. Enlarged.
3. *Phos* (?) *variciferus*, *Tate*. Muddy Creek. Enlarged.
4. *Triton crassicoatus*, *Tate*. Table Cape. Enlarged.
5. *Zemira præcursoria*, *Tate*. Muddy Creek. Slightly enlarged.
6. *Pisania purpuroides*, *Johnston*. Table Cape. Enlarged.
7. *Peristernia affinis*, *Tate*. Table Cape. Slightly enlarged.
8. *Siphonalia longirostris*, *Tate*. Schnapper Point.
9. *Murex* (*Phyllonotus*) *Legrandi*, *T. Woods*. Table Cape. Slightly enlarged.

10. *Peristernia transenna*, *T. Woods*. Table Cape. Slightly enlarged.
11. *Epidromus Tasmanicus*, *Johnston*. Table Cape. *a*, Enlarged; *b*, magnified ornament.
12. *Phos liracostatus*, *T. Woods*. Table Cape. Slightly enlarged.

PLATE XII.

1. *Dennantia Ino*, *T. Woods*. Muddy Creek. *b*, Apex enlarged; *c*, Side view of outer lip, much enlarged.
2. *Dennantia cingulata*; var, *Tate*. Schnapper Point.
3. *Dennantia Ino*; var, *Tate*. Muddy Creek.
4. *Fusus Johnstoni*, *T. Woods*. Table Cape. *a*, Adult; *b*, Young shell (type spec.), slightly enlarged.
5. *Dennantia cingulata*, *Tate*. Schnapper Point. *b*, Enlarged ornament.
6. *Nassa crassigranosa*, *Tate*. Muddy Creek. *a*, Adult, enlarged; *b*, Senile example.
7. *Ricinula subreticulata*, *Tate*. Muddy Creek. Enlarged.
8. *Purpura abjecta*, *Tate*. Muddy Creek.
9. *Nassa Tatei*, *T. Woods*. Muddy Creek. Senile example, enlarged.
10. *Voluta uncifera*, *Tate*. River Murray Cliffs.
11. *Voluta McDonaldi*, *Tate*. Schnapper Point. (A very young shell, with one ordinary spire-whorl.)
12. *Lyria harpularia*, *Tate*. Muddy Creek.

PLATE XIII.

1. *Cominella Clelandi*, *Tate*. Hallett Cove.
2. *Leucozonia tumida*, *Tate*. Muddy Creek. Much enlarged.
3. *Voluta tabulata*, *Tate*. Murray Desert.
4. *Voluta ellipsoidea*, *Tate*. Muddy Creek.
5. *Fusus Tateanus*, *T. Woods*. Table Cape.
6. *Voluta pseudolirata*, *Tate*. Muddy Creek.
7. *Voluta pagodoides*, *Tate*. Aldinga.
8. *Voluta (Volutaconus) limbata*, *Tate*. Schnapper Point. *b*, Sculpture, magnified.
9. *Voluta (Volutaconus) conoidea*, *Tate*. Muddy Creek.
10. *Voluta cathedralis*, *Tate*. Muddy Creek.

 ERRATA.

- Page 92. Under *Typhis disjunctus*, for fig. 14 read fig. 1.
 Page 104. Under *Murex Legrandi*, for fig. 8 read fig. 9.
 Page 121. Under *Triton armatus* for fig. 3 read fig. 1.